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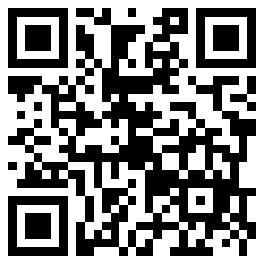

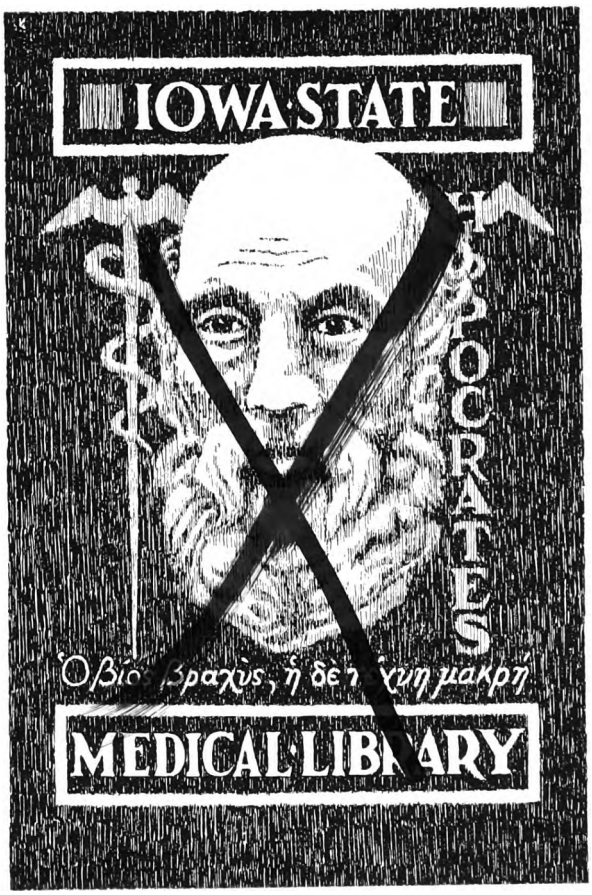

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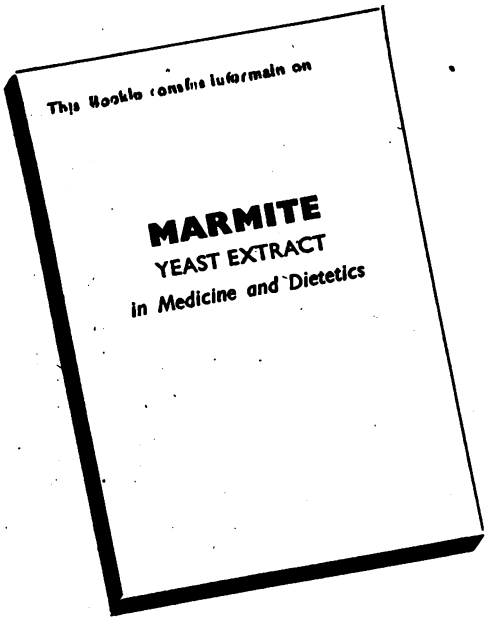

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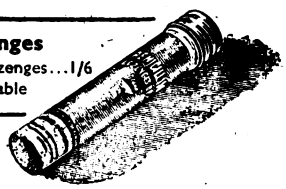

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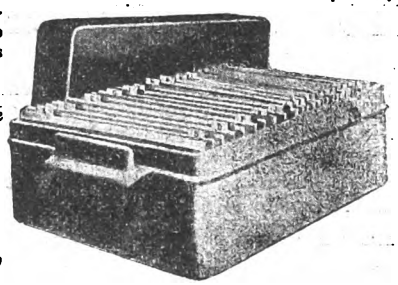

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THE CONNEXIONS OF THE FRONTAL LOBES OF THE BRAIN*

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THE functional significance of the frontal lobes of the human brain has always been a matter of the greatest interest to the psychologist, for the gross facts of comparative anatomy suggest that the frontal lobes reach their acme of development in man, and that they comprise the seat of the highest levels of mental activity.

But more careful quantitative studies, such as those made by von Bonin (1941), have shown that the progressive relative enlargement of the frontal lobes in the phylogenetic scale is by no means so conspicuous as that of the parietal or the temporal lobes. This fact has been re-emphasised by Meyer and McLardy (1947), who point out that, though it does not disprove the preoccupation of the frontal lobes with emotional and personality integration, it casts doubt on the common assumption that these lobes are man's greatest developmental achievement and therefore likely to be particularly concerned in his highest mental activities.

In recent years, however, the increasing therapeutic use of prefrontal leucotomy has directed attention far more closely to the functions of the frontal lobes and has provided much material for their elucidation. The functions of the frontal lobes, as of all other parts of the brain, must depend ultimately on their anatomical connexions, and a review of these will therefore be an important preliminary to physiological and psychological studies.

Definition.—The term "frontal lobe" is a general topographical term to which no precise definition is usually given. It is used here to denote all that part of the cerebral cortex which lies anterior to the motor and premotor cortex (areas 4 and 6 of Brodmann) and extends back on the medial aspect of the hemisphere to the front end of the corpus callosum so as to include the precallosal portion of the cingulate gyrus. All these cortical regions are sometimes designated by the inclusive term "frontal cortical areas" or "prefrontal areas."

FRONTAL LOBES AS A PROJECTION AREA

It is probably fair to say that the frontal cortex is commonly regarded as primarily an association area—i.e., a cortical area predominantly concerned with the reception of impulses which pour into it from *other* regions of the cerebral cortex—and that it thus forms one of the highest functional levels for the integration of cortical activities as a whole. But this conception has no sound anatomical basis, for there is no evidence of the existence of massive long association tracts streaming forward into the frontal lobe from all the other regions of the cerebral cortex. It also obscures the important fact that a great part of the frontal cortex is an afferent projection area comparable with the visual or auditory areas of the cortex. It is of the highest importance for the consideration of the functions of the frontal lobes that this fact should be realised.

Connexions with Dorsomedial Nucleus of Thalamus

As was first demonstrated experimentally in lower animals (Clark and Boggon 1933), a large proportion of the frontal cortex is a projection area for the dorsomedial nucleus of the thalamus, the "medial nucleus" of human anatomical terminology (fig. 1). In the macaque monkey thalamocortical fibres are known certainly to proceed from the dorsomedial nucleus to area 8 and to areas further forward, and the projection is sharply localised in the sense that specific loci of these cortical areas receive impulses from circumscribed groups of cells in the dorsomedial nucleus. In other words, the projection shows a fairly well-defined point-to-point organisation. According to Mettler (1947) the dorsomedial nucleus connects with all the areas from 8 to 12 in the frontal lobe of the monkey, the fibres going to these areas approximately in order from the caudolateral part of the nucleus to the anteromedial part.† Experiments on lower primates, however, are not entirely adequate for the definition of the connexions of the frontal lobes in man, except in a general way. Fortunately, a great deal of evidence is now accumulating from the study of leucotomised brains from patients who have died some time after the operation from causes not directly connected with it.

Thus Meyer et al. (1947), from a detailed analysis of the site of retrograde degeneration in the dorsomedial nucleus of the thalamus in different cases, conclude that the pars magnocellularis of this nucleus projects on to areas 11 and 12 in the orbital region of the frontal lobe, and that, of the pars parvicellularis—i.e., the main part of the dorsomedial nucleus—the medial part projects on to area 11 and probably area 47, the dorsolateral part to areas 45 and 46 in the inferior frontal convolution, the ventrolateral part to area 8 in the superior frontal convolution, and the central part to areas 9 and 10 and possibly 6 in the middle frontal convolution. Broadly speaking, also, the anteroposterior axis of the dorsomedial nucleus projects in serial order on to the anteroposterior axis of the frontal lobe.

Meyer et al. have also found evidence that another nuclear element of the thalamus, the nucleus submedius, sends fibres to the superior frontal convolution near area 8.

Somewhat similar results have been obtained by Freeman and Watts (1947) in their study of the retrograde degeneration in the thalamus following prefrontal leucotomy. They state, however, that area 8 also receives fibres from the anterosuperior extremity of the ventral nucleus of the thalamus. This observation is perhaps open to question, for it conflicts with all the experimental evidence based on the study of lower primates and is also contradicted by Meyer et al. on the basis of their more abundant human material. According to the latter, the most anterior part of the ventral nuclear complex does not project more anteriorly than on to area 6 of the cerebral cortex.

The nature of the impulses conveyed to the frontal areas of the cortex from the dorsomedial nucleus can hardly be defined yet in detail from the purely functional point of view, but it is now possible to state with confidence that the dorsomedial nucleus is essentially a relay station for the transmission of impulses originating in the hypothalamus (fig. 1). This assumption was first made on the evidence of Marchi experiments, and of silver preparations of the normal brain in which very fine fibres of the periventricular system can be seen extending up alongside the wall of the third ventricle from different parts of the hypothalamus to reach the medial or magnocellular component of the dorsomedial nucleus (Clark and Boggon 1933). More recently this connexion has been established by studying the effect of hypothalamic stimulation on action potentials in the cortex.

Murphy and Gellhorn (1945) have found that strychninisation of the posterior hypothalamus fires the dorsomedial nucleus when the cortical effects have not yet been produced, or even in their complete absence. On the other hand, strychninisation of the dorsomedial nucleus causes "firing" first in the ipsilateral and then in the contralateral cortex.

Using the criteria of the comparative amplitude of response, the time of appearance, and the persistence of strychnine

† It should be emphasised that the cortical areas enumerated in this communication (as also in the literature to which reference is made) are to be regarded as schematic approximations only. The boundaries between these areas are often difficult to define, and in some cases are probably also variable.

Communicated to the International Conference of Physicians on Sept. 12, 1947.

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spikes, Murphy and Gellhorn conclude that the following pathways form tracts of preferential discharge: (1) hypothalamus to dorsomedial nucleus; (2) dorsomedial nucleus to cortex; and (3) cortex to dorsomedial nucleus and hypothalamus.

Thus there are clearly functional pathways from the hypothalamus to the cortex via the dorsomedial nucleus, and direct efferent connexions from the cortex to the hypothalamus.

Obrador (1943) has found that a lesion limited to the hypothalamus and basal region of the brain abolishes the spontaneous electrical activity of the cerebral cortex, and that the hypothalamus appears to influence cortical activity by way of the thalamus.

It is probable, also, that the impulses from the hypothalamus to the dorsomedial nucleus may be modified in the latter by other impulses which reach it from the ventrolateral nuclear complex of the thalamus, for Murphy and Gellhorn (1945) have also found that the dorsomedial nucleus (as well as the hypothalamus) is fired by strychninisation of the ventrolateral group of nuclei.

It may be inferred from these anatomical data that the impulses which stream into the frontal lobes from the dorsomedial nucleus represent the resultant not only of the activities of the hypothalamus but also of some of the activities of the thalamus proper.

Connexions with Anterior Nucleus of Thalamus

The frontal cortex also receives hypothalamic stimuli from another source by way of the anterior nucleus of the thalamus. This nucleus is known, from experimental work on lower animals, to project on to the limbic areas in the cingulate gyrus (areas 24 and 23). Area 24 (anterior limbic area) occupies the precallosal part of the cingulate gyrus and thus comes into the frontal lobe as here defined (fig. 1). According to the observations of Meyer et al. (1947) area 24 in the human brain receives afferent fibres from the anteromedial element of the anterior nucleus. The significance of the anterior nucleus of the thalamus lies in the facts that it is the terminal station of the mamillothalamic tract conveying impulses from the mamillary body in the hypothalamus, and that the mamillary body receives the efferent tract from the whole of the hippocampus—i.e., the fornix system. Thus areas 24 and 23 comprise essentially a neopallial projection area for the hippocampus by way of the hypothalamus and the anterior nucleus of the thalamus.

For many years the significance of this projection system has been obscured by the assumption that the whole of the hippocampus constitutes an olfactory mechanism; but the evidence for this is inconclusive (Brodal 1947). Probably no part of the hippocampus receives purely olfactory impulses or can be said to be predominantly olfactory in function, with the possible exception in man of the extreme anterior extremity, that part which has been termed the hippocampus inversus. Until more is known of the connexions and functions of the hippocampus, the significance of the projection from the anterior nucleus of the thalamus to areas 24 and 23 must remain in doubt. It may be noted, however, that these areas (like area 8) comprise one of the suppressor bands of the cortex—i.e., stimulation in this region leads to a suppression of the spontaneous electrical activity of the whole of the cerebral cortex.

From what has been said, one fact which stands out very strongly is that, by way of the anterior and dorsomedial nuclei of the thalamus, the greater part of the cortex of the frontal lobe must be regarded as a projection area receiving the products of activity of the hypothalamus, in the same way that the visual cortex is the projection area for retinal activities, or the auditory cortex for cochlear activities. In the case of the anterior limbic area, the hypothalamic connexion serves mainly as a relay station for the hippocampus.

Connexions with Other Thalamic Nuclei

The question arises whether other thalamic nuclei besides the anterior and dorsomedial nuclei send fibres to the cortex of the frontal lobe. There is no direct anatomical evidence of such a connexion—indeed this type of evidence appears to negative such a possibility. But reference should be made to the work of Morison and Dempsey (1942) on thalamocortical relations generally. These workers made a topographical analysis of thalamocortical connexions by observing the alterations in the electrocorticogram which are induced by local thalamic stimulation. They found focal responses with a distribution of a type previously demonstrated by experimental anatomical methods. But they found another response of a different type produced by stimulation near the medial medullary lamina of the thalamus; stimulation anywhere in this active thalamic area produced the effect in all parts of the cortex which were explored. Thus, there appear to be two systems of thalamocortical fibres: (1) a specific projection system with a more or less point-to-point arrangement; and (2) a secondary non-specific system with diffuse connexions. The possible existence of such a secondary system is to be borne in mind in the consideration of the afferent connexions of any area of the cortex.

FRONTAL LOBES AS AN ASSOCIATION AREA

We have now to consider the intercortical connexions of the frontal lobes—i.e., the association-fibre systems which link its different cortical areas with other cortical areas of the cerebral hemisphere (fig. 2). By ordinary anatomical methods it has not so far proved possible to define these systems with any degree of accuracy. Recently, however, the development of the method which has been termed "physiological neuronography" has advanced our knowledge of the association fibres of the cortex to a remarkable degree. As regards the frontal lobes, however, the data are still very incomplete.

Afferent Fibres

So far as afferent association-fibre systems are concerned, connexions to area 8 from area 6 have been established, and probably similar short interconnexions exist between other frontal areas. As regards long association tracts, connexions have been described in the monkey's brain conducting in a forward direction from area 18 of the occipital cortex to area 8.

Of particular interest because of their connexions with other cortical areas are areas 31 and 32. These form a curved belt of cortex on the medial surface of the

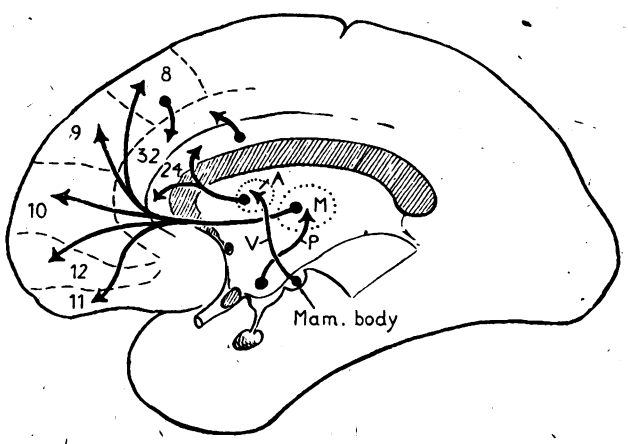

Fig. 1—Right cerebral hemisphere from medial aspect, showing main afferent connexions of cortex of frontal lobe. In figs. 1–3 only those fibre pathways which are firmly established are shown. Approximate extents of main cortical areas of frontal lobe are also indicated. A, anterior nucleus of thalamus; M, dorsomedial (medial) nucleus of thalamus; P, periventricular system of fibres extending from hypothalamus to dorsomedial nucleus; V, mamillothalamic tract (bundle of Vicq D'Azyr).

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hemisphere surrounding the limbic areas (areas 24 and 23) and usually separated from them by the sulcus cinguli (fig. 1). Area 32 lies immediately in front of the pre-callosal portion of the cingulate gyrus and thus forms a considerable part of the frontal lobe on its medial aspect. It has been demonstrated by Bailey et al. (1944) that this belt of cortex receives afferent connexions from all the known suppressor areas (areas 19, 2, 4s, 8, and 24). So far as is known at present, it receives no association fibres from other cortical areas, and it gives off no fibres passing in the reverse direction to the suppressor areas. Further, it is not itself a suppressor area. The significance of the remarkable connexions of areas 31 and 32 remains still to be determined, but these areas clearly comprise a focal region of the cortex intimately concerned with the activities of the cerebral cortex as a whole.

One of the long association tracts which exist in the cerebral hemisphere has its origin in area 8 of the frontal lobe, the area which is included in the "frontal eye field." This fasciculus passes backwards and extends directly to the parastriate area (area 18) surrounding the visual cortex of the occipital lobe. The other main afferent intercortical connexions of area 18, it should be observed, are derived from the adjacent visual cortex. Thus this long association system provides a mechanism whereby the products of frontal-lobe activity

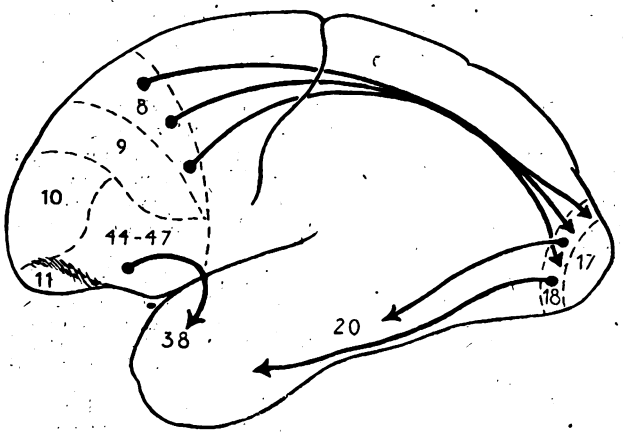

Fig. 2—Left cerebral hemisphere from lateral aspect, showing long association tracts through which impulses from frontal lobe are transmitted back to cortex of occipital region and temporal lobe.

are immediately brought into relation with the visual system.

Another efferent association tract from the frontal lobe takes origin from area 47 (area orbitalis agranularis) and curves downwards and backwards as the uncinate fasciculus to reach area 38 in the pole of the temporal lobe (fig. 2). Degeneration in the uncinate fasciculus has been reported by Meyer et al. (1947) in their series of leucotomised human brains. The impulses projected back from the frontal lobe to area 18 may also be eventually relayed to the temporal lobe, for a third long association fasciculus extends from this area to area 20 in the inferior temporal convolution.

Much of the temporal cortex seems thus to be concerned with the ultimate reception directly or indirectly of the association-fibre systems of other areas of the cerebral cortex and therefore receives the resultants of cortical activity as a whole. This is a matter of particular interest, since (except for the auditory area) the temporal cortex shares with the insular cortex the distinction of having no afferent projection systems from the thalamus, and herein contrasts rather strongly with most other areas of the cortex.

Attention may also be called to significant features in the callosal connexions of area 8 in the frontal lobe.

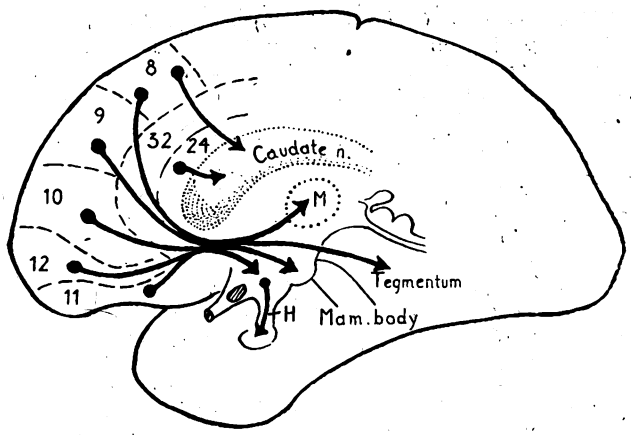

Fig. 3—Right cerebral hemisphere from medial aspect, showing main efferent connexions of cortex of frontal lobe: M, dorsomedial (medial) nucleus of thalamus; H, descending tract from hypothalamus to posterior lobe of pituitary.

First, this area is the only one of the suppressor areas which gives rise to any callosal fibres (McCulloch 1944). Secondly, while those non-suppressor areas of the cortex which give rise to callosal fibres are connected predominantly with symmetrically placed areas in the opposite cerebral hemisphere (Curtis 1940), area 8 connects solely with area 18 in the occipital region of the opposite side.

Efferent Fibres

The efferent connexions of the frontal lobes with subcortical centres may be divided into corticostriate, corticothalamic, and corticohypothalamic connexions, and descending connexions with the brain-stem (fig. 3).

The *corticostriate* fibres originate in the two suppressor areas of the frontal cortex, areas 8 and 24, and terminate in the caudate nucleus (Garol and McCulloch 1944). These pathways form part of the general system of descending connexions between suppressor areas of the cortex and the caudate nucleus, connexions forming part of a circuit through which the suppressor functions of these areas are mediated by way of the hypothalamus and thalamus.

The *corticothalamic* fibres from the frontal areas descend to the dorsomedial nucleus. As we have seen, such connexions have been inferred by Murphy and Gellhorn (1945) in their electrophysiological experiments. They have also been affirmed on the basis of Marchi experiments in lower animals (Clark 1932), but this evidence alone is perhaps not quite conclusive. However, terminal degeneration in the dorsomedial nucleus, though not very conspicuous, has lately been observed to follow lesions in the frontal cortex (M. Meyer, personal communication).

The *corticohypothalamic* fibres have been studied by Ward and McCulloch (1947) by the method of physiological neuronography. These studies appear to demonstrate that rather specific descending connexions exist between different areas of the frontal cortex (and area 6a) and different nuclear elements of the hypothalamus, particularly the supraoptic and paraventricular nuclei, the lateral and posterior hypothalamic areas, and the mammillary body. The connexions with the paraventricular and supraoptic nuclei are of special significance, for the supraoptic nuclei are known to be connected functionally with the posterior lobe of the pituitary by tracts of unmyelinated fibres which descend through the infundibular or pituitary stalk. This evidence for direct corticohypothalamic connexions receives some support from the study of terminal degeneration in silver preparations in leucotomised brains (M. Meyer, personal communication), and also confirms the work

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of Murphy and Gellhorn (1945). Together with the afferent projection systems to the frontal lobes from the hypothalamus, they indicate a very close functional organisation between the hypothalamus and the frontal cortical areas.

The descending pathways from the frontal lobes to the brain-stem are perhaps less certainly defined than the other efferent connexions already mentioned. Some account of them has been given by Levin (1944) and Smith (1944). The prefrontal origin of Arnold's bundle (the prefrontopontile tract) is now well established. From the studies of Meyer et al. (1947) it appears probable that this tract originates in area 10. Corticotegmental fibres extend down to the tegmentum of the midbrain, and a considerable proportion of these are contributed by area 8. It has already been noted that this area is included in the frontal eye field. According to Smith (1944) ocular movements in man are obtained by stimulation of the caudal part of the superior, middle, and inferior frontal convolutions, and of the precentral gyrus (probably involving portions of areas 6, 8, and 9, and possibly 46). From this region fibres extend to the tegmentum, and some have also been described as terminating in the substantia nigra and subthalamic nucleus. These latter connexions, however, seem still rather doubtful. No fibres from the frontal eye field have been traced as far as the oculomotor nucleus, and none have been followed to a level below the pons.

CONCLUSION

The connexions of the frontal lobes which have been briefly described in this simplified account are the more important pathways which are now well established and may therefore be assumed to provide a firm anatomical basis for the discussion of functional problems. The outstanding implications of these connexions are undoubtedly to be found in the intimate two-way relationship between the frontal lobes and the hypothalamus, and in the association-fibre systems whereby the activities of the frontal areas are conveyed to many other regions of the cerebral cortex.

REFERENCES

Bailey, P., von Bonin, G., Davis, E. W., Garol, H. W., McCulloch, W. S., Roseman, E., Silveira, A. (1944) *J. Neurophysiol.* **7**, 51.

Brodal, A. (1947) *Brain*, **70**, 179.

Clark, W. E. Le G. (1932) *Philos. Trans.* **222**, 1.

— Boggon, R. H. (1933) *Brain*, **56**, 83.

Curtis, H. J. (1940) *J. Neurophysiol.* **3**, 407.

Freeman, W., Watts, J. W. (1947) *J. comp. Neurol.* **86**, 65.

Garol, H. W., McCulloch, W. S. (1944) *J. Neurophysiol.* **7**, 199.

Levin, P. M. (1944) in P. C. Bucy's The Precentral Motor Cortex. Illinois; p. 133.

McCulloch, W. S. (1944) *Ibid*, p. 211.

Mettler, F. A. (1947) *J. comp. Neurol.* **86**, 95.

Meyer, A., Beck, E., McLardy, T. (1947) *Brain*, **70**, 18.

— McLardy, T. (1947) *Proc. R. Soc. Med.* **40**, 141.

Morison, R. S., Dempsey, E. W. (1942) *Amer. J. Physiol.* **135**, 281.

Murphy, J. P., Gellhorn, E. (1945) *J. Neurophysiol.* **8**, 431.

Obrador, S. (1943) *Ibid*, **6**, 81.

Smith, W. K. (1944) in P. C. Bucy's The Precentral Motor Cortex. Illinois; p. 307.

von Bonin, G. (1941) *J. comp. Neurol.* **75**, 287.

Ward, A. A. jun., McCulloch, W. S. (1947) *J. Neurophysiol.* **10**, 309.

"... So wide is the range of interests covered by a University, so great are the financial obligations which the fulfilment of these interests imply, that a considerable degree of State aid is an absolute necessity. To suggest that we are in the position of a debtor to the State is not an accurate presentation of the position. Rather are we the medium by which are carried out the educational and research activities upon which the progress and prestige of a State depends."—The late Sir JOHN FRASER in his last address to the general council of the University of Edinburgh, Oct. 31, 1947.

FUNCTIONS OF THE FRONTAL LOBES*

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IN the latter part of last century experimental and clinical observations on the functions of the frontal lobe† began to be made in many countries. In England Ferrier (1878) was engaged with extirpation experiments in monkeys and in correlating his findings with the effects of disease in man.

On looking through the writings of these early workers one is impressed with the apparent modernness of their views. This is because our knowledge of the functions of the prefrontal lobes has advanced little during the past seventy years, perhaps less than that of any other part of the cerebral hemispheres.

For example, Fulton (1943) writes that the types of deficit observed after removal of the frontal lobes relate to alterations in behaviour—to "intellectual deficits"—whereas seventy years ago Ferrier wrote "the removal of the frontal lobes causes no motor paralysis or other evident physiological effects but causes a form of mental degradation." Ferrier considered that man's relatively great intellectual power must be associated with his having the greatest frontal development, and that there were good grounds for localising the reflective faculties in the frontal regions of the brain.

FRONTAL-LOBE SYNDROME

There is still some argument about whether removal of one or both prefrontal lobes necessarily causes much change in intelligence or personality, but none will dispute that the so-called frontal-lobe syndrome does occur. The famous American crowbar case of nearly a century ago provides a remarkable record of bilateral frontal-lobe injury.

An iron bar nearly 4 ft. long and $1^1/_4$ in. thick was forced by an accidental explosion through the skull of Phineas Gage, aged 25. The bar entered below the left orbit and came out of the top of his head in the midline anterior to the coronal suture. He was only stunned for an hour, and then walked with help to see a surgeon.

Gage lived for twelve years; but, whereas he had been a most efficient and capable foreman, after the injury he was unfit to be given such work. He became fitful and irreverent, and indulged at times in the grossest profanity, manifesting but little deference for his fellows. He was impatient of restraint or advice, at times pertinaciously obstinate, yet capricious and vacillating, and devising many plans of future operations, which were no sooner arranged than abandoned in turn for others. A child in his intellectual capacity and manifestations, he had the animal passions of a strong man.

It is difficult to add much to these clinical notes of so long ago. Some of the severe cases of frontal brain wound from the war 1939–45 give a very similar picture.

Case 1.—A private soldier had a severe right frontal wound (fig. 1) in August, 1944, and was reported to be conscious thirty hours later. The wound was debrided to a depth of 4 cm., and there was much pulped brain. The missile was not removed, but later a "wandering" bullet was removed from the right frontal subdural space.

The patient was rational a month after wounding, and there was no weakness of the limbs.

Before the war he had had some difficulty in learning at school, and after special coaching had failed in the Oxford junior examination at the age of $15^1/_2$. In psychometric tests three months after wounding he gave a poor performance. For example, his comprehension of pictures was quick and accurate, but he failed to repeat the Babcock sentence after 5 repetitions. Matrix score at first attempt was 35, at second attempt 44. Attention was poorly sustained, and he was euphoric and disinhibited in his approach to problems.

* Communicated to the International Conference of Physicians on Sept. 12, 1947.

† Anatomists include the motor cortex in the frontal lobes, but I am here considering only the prefrontal lobes anterior to area 6.

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After his discharge on Nov. 9, 1944, he failed to hold employment of any kind, and in July, 1947, his father writes as follows:

"Since my son's discharge from the Army he has shown no power of concentration whatsoever. He is unable to remain still for any length of time, walking from room to room. He sleeps abnormally long hours, and has an enormous appetite. He shows no interest in any hobby, and never completes anything he may start. His language is obscene, and his chief conversation is about sex; this began from his first conscious moments in hospital, when he said that all the nurses were prostitutes. Notwithstanding the fact that sex predominates in his mind, he has not shown any zeal or over-interest in running after girls, and I have had no reason to think that I should have any worry from this. Books that he reads are of jungle subjects, and he only reads them at odd chapters, never from beginning to end."

There had been no fits and no complaint of headache or giddiness.

The similarity of this record to that of Phineas Gage is very obvious, and both show what has come to be regarded as the typical frontal-lobe syndrome. The anatomical basis for these gross cases of frontal-lobe syndrome is not clear, but the injury must be deep and must extend far back in the frontal lobe.

EXPERIMENTAL RESULTS

In the experimental field progress has also been limited. Ferrier, 75 years ago, found that bilateral removal of the prefrontal area in monkeys caused considerable psychological alteration in their behaviour. In recent years careful studies, such as those by Jacobsen et al. (1935), have analysed this change by studying the

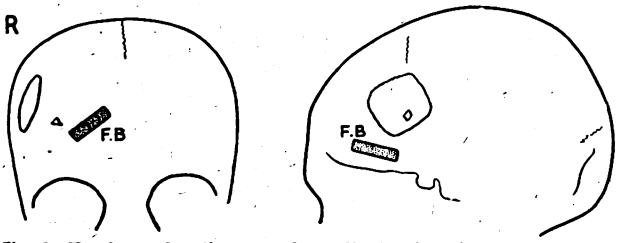

Fig. 1—Tracings of radiograms (case 1) showing site of wound and bullet (F.B.) in right frontal lobe.

effect of prefrontal lobectomy on the performance of monkeys trained to solve mechanical problems.

Jacobsen's (1934) observations on the effect of prefrontal lobectomy in experimental neurosis were of exceptional importance, for he clearly showed that the behaviour of a chimpanzee with neurosis and temper tantrums was completely altered by the operation. The neurosis was cured at the expense of losing some ability to solve problems. This led to the application by Moniz (1936) of the operation of frontal lobotomy in man which is now so widely practised.

The published records—e.g., Rylander (1939)—of the effects of unilateral removal of one prefrontal lobe have been somewhat varied. Performance on the standard psychometric tests has been remarkably good, but the patient's relations often notice a change of personality with minor intellectual deficits.

Two facts stand out clearly: (1) there is little difference between the effects of removing the right or the left prefrontal lobe; and (2) the removal of both prefrontal lobes causes more intellectual deficit than does removal of one only. It also seems clear that the effect of removal varies from case to case, as was shown by the studies of Kleist and others in Germany on frontal wounds after the war of 1914–18.

FRONTAL BRAIN WOUNDS

In the late war most of the non-fatal brain wounds were due to small high-velocity missiles which caused a small area of brain destruction but often no concussion. For example, in 350 cases of brain wound in which the dura was penetrated there was full preservation of consciousness—i.e., no amnesia—in 150 cases (43%). There have thus been many opportunities of studying the effect of small focal brain wounds, and it can at once be stated that the severe frontal-lobe syndrome is

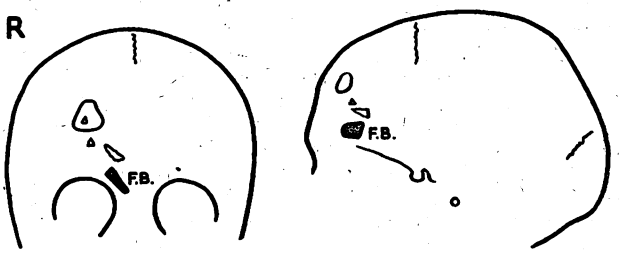

Fig. 2—Tracings of radiograms (case 2): F.B., fragment of metal.

observed in only a very small proportion of frontal-lobe wounds.

In most frontal-lobe wounds fair recovery takes place. Of 75 unselected patients who have recovered from a frontal brain wound 66 (88%) are in some form of employment two years after wounding, though the employment is often of a simple kind. There is often evidence of some change of personality and intellectual deficit. This is sometimes difficult to demonstrate by psychometric tests, and often the evidence provided by an intelligent patient or by his relations gives the best indication of his disability.

Common symptoms are restlessness, inability to maintain attention or to plan, lack of self-control, difficulty in learning, failure at technical or professional occupations, loss of interest in former hobbies or games, tactlessness, fatigability, and, more rarely, nocturnal enuresis.

The type of disability that follows small prefrontal wounds is illustrated by two short case-records.

Case 2.—A battalion intelligence officer was wounded on July 16, 1944, when aged 27. Fig. 2 illustrates the site of the right frontal wound. There was no amnesia (the patient was right-handed). After debridement a cavity in the frontal pole measured 5 × 2 × 2 cm.

Three weeks after wounding he did intelligence tests quite well, but was slightly disinhibited in his behaviour and made some careless mistakes. Eighteen months after being wounded he was reported by his medical officer to be an efficient testing officer for the War Office selection board, but to have become more extroverted since his injury. The patient himself complained of inability to concentrate for long, but otherwise thought his health excellent.

Case 3.—A private, aged 35, was wounded on Sept. 17, 1944, in the left frontal region, a small metal fragment penetrating to the right frontal lobe (fig. 3). Amnesia was for less than an hour, and there was a good surgical recovery.

Two and a half years later the patient was working as a bricklayer; but he complained of lack of energy and concentration and evidently had difficulty in controlling his thoughts.

He writes: "If I have a problem, no matter how minor, it keeps revolving over and over in my mind so much that I become mentally tired, and I have to read a book to break my train of thought. I'm forgetful, but not too bad—I guess I feel old before my time."

These examples illustrate the slight disability observed after *small* frontal-lobe wounds, whether the right or left side of the brain is injured. The mental change is not of a type which psychometric tests will detect.

EMOTIONAL REACTIONS AND MEMORY

Studies of the comparative anatomy of the cerebral cortex, such as those by Herrick (1930), indicate that the cortex both controls and extends the activity of the regions of the more primitive corpus striatum and thalamus, with which it is associated. Prof. W. E. Le Gros Clark has drawn attention to the important

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thalamic and hypothalamic connexions with the prefrontal lobe which strongly suggest that the prefrontal lobes play an essential rôle in emotional and visceral reactions. On theoretical grounds, therefore, it is probable that an important function of the prefrontal lobes is concerned with the control and development of emotional reactions, and the clinical changes observed after severe frontal-lobe injury are on the whole consistent with this view.

The pattern of adult human behaviour must depend to a large extent on memory, and it is clear from studies of both frontal wounds and of frontal-lobe operations that the processes of memory are not centred chiefly in the frontal region. It seems evident that the removal of neither the whole right hemisphere (the left being dominant) nor both prefrontal lobes leads constantly to gross loss of established memories or alteration of behaviour or intelligence in the adult.

Memory of past events and the basic pattern of adult behaviour and intelligence seem to have their centre near the posterior half of the boundary junction between the parietal and temporal lobes of the brain in the dominant (speech) hemisphere. Small penetrating wounds in the left posterior parietotemporal region almost invariably cause protracted amnesia, whereas similar small wounds elsewhere in the cerebral hemispheres, including the right parietotemporal region, lead to little or no disturbance of consciousness. Further, it is well known that injury to the white matter underlying this area of the dominant hemisphere has a disastrous effect on mental faculties of all kinds, including the speech mechanism. Indeed the chief mechanism for the pattern of thought and behaviour and the speech mechanism seem to some extent to be one and the same. These are also intimately interwoven with the mechanism of recording afferent stimuli past and present so that they are available for recall. Clinical studies certainly indicate that the white matter of the parietotemporal region in the dominant hemisphere is the hub of these fundamental mechanisms.

FRONTAL-LOBE INJURY IN YOUNG CHILDREN

It seems at first sight paradoxical that extensive destruction of the prefrontal lobes at operation should often cause so little change in behaviour and intelligence when it is generally assumed that the frontal lobes are of paramount importance in the dominance of the human species. One reason, perhaps, is that the highest refinements of human behaviour and intellect are very difficult to evaluate and may in the so-called normal person be little developed. On the other hand, it is possible that these highest achievements of human thought require the enormous frontal association areas with which to operate to best advantage.

This explanation, however, does not cover all cases. I suggest that by early or middle adult life the frontal lobes have already done much of their work by conditioning and moulding the pattern of the behaviour responses of the dominant left parietotemporal area. If this view is correct, injury to the prefrontal lobes in young children should lead to a very obvious failure of mental development, but it is difficult to get reliable information about cases of this kind.

There is some evidence to show that the mental effect of brain disease in children differs from that in adults. For example, it is well known that severe head injury or encephalitis in small children may lead to persistent disorders of behaviour and arrest of mental development. It is, however, not known whether injury to the frontal lobes plays an important part in this clinical picture. Some evidence of the importance of the frontal lobes in the development of intelligence in childhood is provided by the association of amentia with atrophy or arrest of development of the frontal lobes (Bolton 1914).

Norman (1945) reported a remarkable case of this kind in a girl who, apparently normal at the age of 13 months, then had a severe cerebral illness with loss of consciousness. This was followed by severe mental defect and epilepsy. At the age of $8^1/_2$ years there was no gross abnormality on physical examination of the nervous system, but her mental age was only 2 years and 5 months. The child died of tuberculosis at the age of 19 years, and the destructive brain lesion (? vascular) was clearly confined to both prefrontal lobes.

Hebb (1942) has shown that brain injury at birth is followed by a general depression of intellectual development differing considerably from the clinical picture observed after severe brain injury in the adult. He demonstrated convincingly that, after birth injury to the brain, vocabulary and other abilities, tested by the Stanford-Binet method, do not develop normally, whereas this test usually shows little defect after brain injuries in the adult, provided there is no aphasia. Hebb's study did not include investigation of the relative importance of different areas of the brain for mental development.

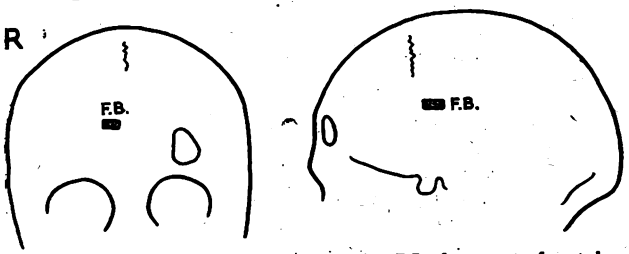

Fig. 3—Tracings of radiograms (case 3): F.B., fragment of metal.

The following case suggests that the frontal lobes are important for mental development.

Case 4.—A boy, aged $5^1/_2$ months, was wounded in an air-raid in November, 1940. A piece of glass still lying in the brain must have severed most of the prefrontal lobe connexions on the right side (fig. 4).

Now aged $6^1/_2$ years, he is very difficult to handle and mentally backward. His mental age, so far as verbal tests are concerned, is about $4^1/_2$ years, but other intelligence tests give a mental age of 2–3 years. Prominent features of his behaviour are violent physical attacks on smaller children and on the school cat, stealing, eating refuse, deliberately emptying tea over his bed, &c. His brothers and sisters are all said to behave normally, though there is some evidence of neurosis in his parents.

Though the evidence is not conclusive, it seems that these various instances support the view that the prefrontal lobes play a specially important part in mental development during the years of learning by moulding behaviour responses at a more posterior level in the dominant hemisphere.

REFINEMENTS OF HUMAN BEHAVIOUR

Man's control of his emotions when he reaches maturity is perhaps one of his most valuable assets, and one which permeates every aspect of his behaviour. One is inclined in this connexion to think only of the crude control of temper or of primitive lusts; but the ability, for example, to make a tactful remark or perform a considerate act represents a much more complicated and higher form of control over emotions influencing the pattern of behaviour. Qualities such as these can be developed fully only by the adult, and one does not expect to see them in the young child. It should not be supposed that frontal control of the emotions always leads to an improvement of behaviour in the ethical sense. The calculated malice, envy, and sarcasm of which adults are capable represent also a high physiological level of activity, which again does not appear in the behaviour of the young child.

These refinements of human behaviour rarely disappear after frontal-lobe injury in the mature adult, but

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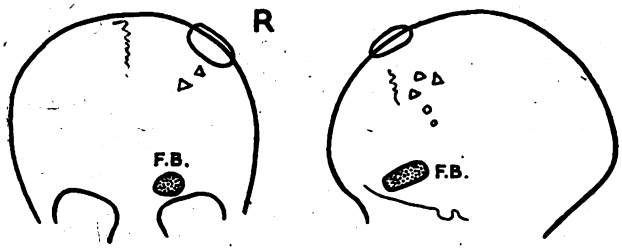

Fig. 4—Tracings of radiograms (case 4): F.B., piece of glass.

there is much evidence to show that they are often impaired, and some evidence that frontal-lobe injury in the young child seriously interferes with their development.

In considering the function of any part of the cerebral cortex it must, however, be borne in mind, as Herrick (1930) has emphasised, that cortical development in relation to lower centres involves much more than an inhibitory mechanism; for, besides the control exercised by the cortex, there is an enormous elaboration of the mechanisms concerned. Perhaps the calculating perseverance of human plans and actions represents this reinforcement of a drive which is basically emotional.

Both the study of frontal wounds and the effects of frontal lobotomy in the adult indicate that the basic pattern of behaviour is not represented in the frontal lobes; yet this frontal mechanism may nevertheless possess the power to exert a decisive influence in controlling the main behaviour patterns, which seem, as has been mentioned, to be established in the posterior parietotemporal region of the dominant hemisphere.

The suggestion that the prefrontal lobes are specially important before adult life leads to the inference that the frontal mechanism during mental development impresses the pattern of behaviour in such a way that its influence may, to a large extent, remain after the prefrontal lobes have gone. Thus after frontal lobotomy the behaviour of the mature adult may show surprisingly little change.

The study of children who have had severe frontal lesions suggests not only that their behaviour is disinhibited, and as one teacher remarked "he behaves like a monkey," but also that they cannot be educated. This at once raises the interesting question of the part played by the emotional mechanisms in leading to a desire or willingness to learn or to perform work of any kind. It is perhaps reasonable on anatomical grounds to consider emotional urges and visceral reactions together. An animal is trained by rewards of food, but in man the urge to learn clearly depends on infinitely more complex and varied forms of incentive.

It is unlikely that the emotional influence on human activity depends simply on some rhythmical activity of the frontohypothalamic mechanism. It is a matter of common experience that any and every afferent stimulus, whether smelt, seen, heard, or felt, may be reflected very quickly to the emotional mechanism. An overheard remark may quickly lead to anger, laughter, or fear, with the appropriate visceral concomitants. These relatively simple responses are seen most clearly in observing the behaviour of children, and are very similar to those of the adult suffering from the effects of a severe frontal injury. In the self-possessed adult the emotional response is well controlled, and concealed from an observer, but it may set in action a behaviour response of great complexity which is much more effective than the crude response of the child.

This control, involving a complex elaboration and exploitation of the emotional response, is clearly an important key to the secret of human greatness, and there is much anatomical and clinical evidence that suggests that the prefrontal lobes play an important part in this mechanism, especially during the years of childhood, adolescence, and early adult life.

Frontal-lobe injuries are often, however, associated with some defect in abstract and relational thinking which cannot be explained simply on the basis of a loss of the ability to exploit the drive of the emotional mechanism, and it seems reasonable to suppose that the extensive frontal association areas are used for other complicated mental processes.

The hypothesis that the functions subserved by the prefrontal lobes and their basal connexions are for the average person of special importance during early life suggests that, as age advances, the frontal-lobe mechanisms provide an asset of diminishing importance, but this factor must vary enormously from person to person. We are all familiar, on the one hand, with the adult of 50 whose thoughts and actions already follow well-defined paths; and, on the other hand, we can think of many who at that age delight in an emotional drive to develop their activities in any profitable direction, and who retain well their originality or thought, their power of intensive application to a problem, and mental receptiveness of new ideas. If the prefrontal lobes and their connexions are used in the emotional drive possessed by the great men of all time, these mechanisms may be seen in their true importance.

The study of patients with frontal-lobe damage suggests that a loss of ambition and drive plays a part in their general ineffectiveness in the rush of modern life. The same incentives to succeed in life remain, but these do not elaborate the ambition necessary to provide for sustained and efficient mental and physical activity.

BILATERAL FRONTAL LOBOTOMY

The beneficial effects of bilateral frontal lobotomy in certain forms of mental disease have been attributed to

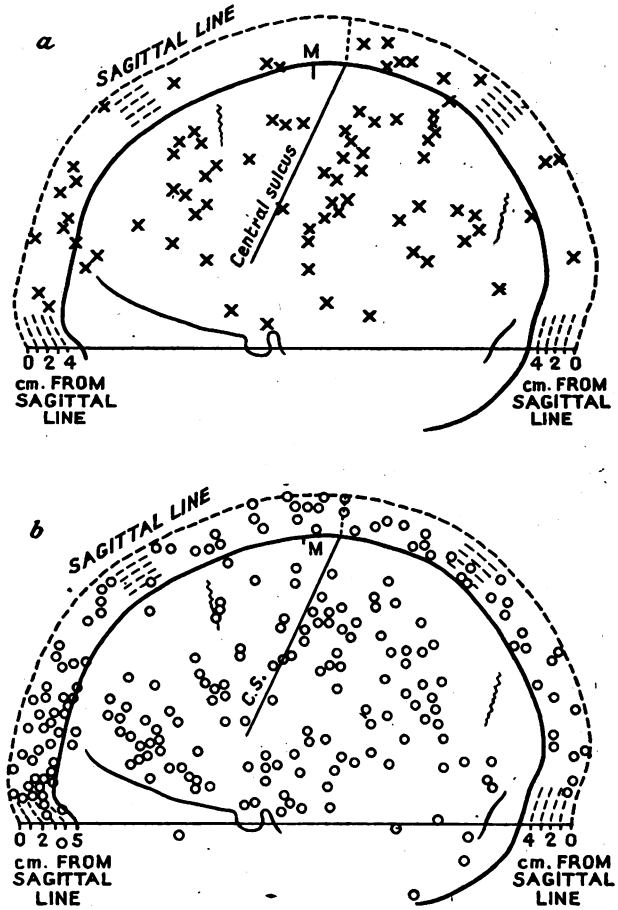

Fig. 5—Incidence of post-traumatic epilepsy in relation to site of trauma: (a) sites of trauma followed by epilepsy; (b) sites of trauma not followed by epilepsy. Wounds lying within 5 cm. of sagittal line are entered on the "halo."

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division of the frontothalamic pathways (Freeman and Watts 1942). To some extent this may be true, for division of this pathway may destroy much of the emotional mechanism we are discussing; but it is unjustifiable to conclude that these mental disorders originate in a dysfunction of the thalamus or hypothalamus. We have already seen that afferent stimuli are quickly relayed for emotional assessment, and the same may be said of human thoughts, hopes, doubts, and fears. Though the sensitivity of the frontohypothalamic system must vary with constitutional and perhaps endocrine factors, the distressing over-reaction of this emotional system observed in mental disease is much more likely to be brought about by confusion at the cortical level.

It seems that the beneficial effect of prefrontal lobotomy in relieving mental tension and severe anxiety may act in one of three ways. Either the operation prevents the relay of the nervous activities engendered by mental conflict to the frontohypothalamic mechanism; or the fire of the mental conflict loses its fuel when no longer stimulated by this mechanism; or most likely the mechanism of mental conflict at a cortical level is highly complex and may be directly interfered with by this operation to such an extent that it can no longer develop the intensity required to stimulate the emotions. However, it is not yet possible to say which of these alternatives is the most important.

There is one further aspect of this subject to which I should like to draw attention. The physiological suppressor bands are known to interleave important areas of the sensorimotor cortex, and it is not impossible that there is a suppressor band further forward in the frontal lobe than area 8. It is possible, therefore, that the anatomical site of the wound may influence the effects according to the amount of suppressor area damaged. The remarkable restlessness and impulsive disinhibited behaviour sometimes observed might be due to loss of a suppressor mechanism. I have previously (Russell 1947) suggested that this is a factor in determining the liability to traumatic epilepsy (see fig. 5). There seems, for example, to be an area of low epileptic incidence between area 8 and the frontal poles. It seems to be undesirable to interfere with the area-8 connexions to the head of the caudate nucleus in carrying out a prefrontal lobotomy, for fear that injury to this projection plays a part in the motor restlessness sometimes observed in deep posterior frontal wounds.

There has been some search in recent years for an anatomical explanation of the motor restlessness which may be seen in frontal injury. The evidence about the effect of bilateral ablation of area 8 in monkeys is conflicting, but Kennard and Ectors (1938) reported hyperactivity. Ruch and Shenkin (1943) also report constant hyperactivity following removal of area 13, and Fulton (1947) has pointed out that this is a good reason for avoiding damage to this area during lobotomy.

CONCLUSIONS

It seems clear, as Rylander (1943) states, that the time is now ripe for investigation of the psychic results of injury to different parts of the frontal lobes. I feel that the evidence suggests that we have all used our prefrontal lobes to a great extent in the past to build up our own peculiar way of thought and life, and to exploit our emotional capacity to provide the necessary drive to work. Most of us can still use them to enable us to work long hours, to change our habits, and to plan along untrodden paths. In our later years it is easier to travel on the well-worn paths of thought and behaviour; so, if our mental conflicts become intolerable, we may then gain something by having our prefrontal lobes destroyed.

I am particularly indebted to Prof. W. E. Le Gros Clark and to Mr. O. L. Zangwill for their advice and criticism.

References at foot of next column

THE IMBALANCE OF VITAMINS
WITH PARTICULAR REFERENCE TO FOLIC ACID

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IT has been claimed that there exists an interrelationship or antagonism between various members of the vitamin-B complex. Such claims are based partly on experiments on animals and partly on the clinical observation that patients in a state of vitamin deficiency may, when treated with one member of the vitamin-B complex, develop the signs of deficiency of another member.

The evidence derived from experiments on animals has been reviewed by Moore (1945), and Richards (1945) has conclusively shown that a state of pyridoxine deficiency can be produced in rats by the administration of excessive quantities of thiamine.

As regards man, it has been reported that pellagrins treated with nicotinic acid may develop beriberi or riboflavine deficiency (Spies et al. 1939, Sebrell and Butler 1938, 1939, Sydenstricker et al. 1940). Some workers have noted the development of pellagra after large doses of riboflavine or of thiamine (Bichel and Meulengracht 1941, Salvesen 1940, Braendstrup 1940, Lehmann and Nielsen 1939).

In a previous report (Davidson and Girdwood 1947) we referred to a patient (case 7 of the previous communication) who developed multiple peripheral neuritis after treatment with folic acid and pyridoxine. We suggested that the metabolic effect of the antineuritic vitamin might have been antagonised by the preceding administration of folic acid and pyridoxine; but, since this was only an isolated case, we decided that infective polyneuritis was more likely the correct diagnosis.

Since then, however, we have observed the development of similar features in other patients treated with folic acid; hence we consider that our original suggestion that folic acid might upset the balance of other members of the vitamin-B complex in the body merits reconsideration.

Accordingly we submit the case-records of four of our patients with megaloblastic anæmia who were treated with folic acid and developed clinical features of peripheral neuritis suggesting beriberi. We also give a report of a patient with tropical sprue who developed a pellagrous syndrome while on folic acid. We have also had 6 patients with pernicious anæmia who developed signs of involvement of the nervous system while undergoing folic-acid therapy.

CASE-RECORDS

Case 1.—A woman, aged 49, with classical addisonian pernicious anæmia was admitted to hospital for folic-acid therapy. Her diet had been satisfactory, and there was no diarrhœa. The marrow was megaloblastic, and there was histamine-fast achlorhydria. Red-cell count 1,500,000 per

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Bolton, J. S. (1914) The Brain in Health and Disease. London.
Ferrier, D. (1878) The Localisation of Cerebral Disease. London.
Freeman, W., Watts, J. W. (1942) Psychosurgery. Springfield.
Fulton, J. F. (1943) Physiology of the Nervous System. London.
— (1947) *Acta med. scand.* 196, suppl. 617.
Hebb, D. O. (1942) *Proc. Amer. phil. Soc.* 85, 275.
Herrick, C. J. (1930) Brains of Rats and Men. Chicago.
Jacobsen, C. F. (1934) *Proc. Ass. Res. nerv. ment. Dis.* 13, 225.
— Wolfe, J. B., Jackson, T. A. (1935) *J. nerv. ment. Dis.* 82, 1.
Kennard, M. A., Ectors, L. (1938) *J. Neurophysiol.* 1, 45.
Moniz, E. (1936) Tentatives opératoires dans le traitement de certaines psychoses. Paris.
Norman, R. M. (1945) *J. Neurol. Neurosurg. Psychiat.* 8, 52.
Ruch, T. C., Shenkin, H. A. (1943) *J. Neurophysiol.* 6, 349.
Russell, W. R. (1947) *Brain*, 70, 225.
Rylander, G. (1939) Personality Changes After Operations on the Frontal Lobes. London.
— (1943) *Acta psychiat. neurol.* suppl. 25.

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c.mm., Hb 36%, colour-index (C.I.) 1·2, P.C.V. 15%, M.C.V. 100·0 c.μ, M.C.H.C. 33·3%, white cells 2000 per c.mm.

She was treated with synthetic folic acid by mouth in a dosage of 5 mg. daily for fourteen days, and then 20 mg. daily for ten days. On the 24th day of folic-acid therapy she became severely ill, with high fever, drowsiness, and, later, delirium. Lumbar puncture showed no abnormality. She was found to have a leucopenia (white cells 800 per c.mm.), and agranulocytosis was diagnosed. Folic-acid therapy was stopped, and the patient was treated with blood-transfusions, parenteral liver extract, penicillin, and pyridoxine (150 mg. daily by mouth). This led to a dramatic rise in the white-cell count, which reached a peak of 9000 per c.mm. fifteen days after the end of folic-acid therapy. • On this day, however, the patient rapidly became paralysed, with loss of reflexes in all four limbs, husky voice, and mental apathy. Plantar responses were normal. Treatment with intramuscular thiamine 25 mg. daily for five days, followed by 3 mg. t.i.d. by mouth for a hundred days was given, with 4 ml. of 'Anahæmin' daily at first and later at longer intervals. The red-cell count and Hb level rapidly improved, reaching normal by the 60th day from the start of treatment with anahæmin. The peripheral neuritis continued to improve slowly but steadily for three months, when the patient was discharged from hospital ambulant.

Attention is drawn to the severe leucopenia in this patient while undergoing treatment with folic acid, in view of the claims of certain writers of the therapeutic value of folic acid in agranulocytosis.

Case 2.—A man, aged 59, with typical addisonian pernicious anæmia was treated by us with 2·5 mg. of folic acid daily. This produced a rise in erythrocytes from 1,710,000 to 4,280,000 per c.mm. in a hundred days, with a coincident rise of Hb from 44% to 100%.

Before the start of folic-acid therapy there was no evidence of neurological involvement; but soon after this treatment started the patient felt coldness and paræsthesiæ in the hands and feet. Despite the excellent hæmatological response, the symptoms in the limbs became more severe, and at the end of a hundred days' treatment with folic acid he had wasting of the muscles of the hands, weakness of grip and of the dorsiflexors of the toes and feet, loss of vibration sense in the lower limbs, and tenderness on pressure over the calf muscles, plantar muscles, and large nerve trunks. There was no evidence of involvement of the pyramidal tracts of the cord.

Folic-acid therapy was stopped, and the patient was given anahæmin 4 ml. daily at first and thereafter less frequently. This led to considerable subjective and objective improvement, though he still felt cold in the legs. The loss of vibration sense became much less extensive.

Case 3.—A man, aged 61, was admitted to hospital with severe megaloblastic anæmia. The red-cell count was 950,000 per c.mm., Hb 28%, C.I. 1·47, P.C.V. 13%, M.C.V. 136 c.μ, M.C.H.C. 30%, white cells 5200 per c.mm. The blood and bone-marrow appearances were indistinguishable from those of classical addisonian pernicious anæmia. Free hydrochloric acid, however, was present in the gastric juice. He had no diarrhœa before or during his initial admission to our wards, and his previous diet had been satisfactory. He had never been abroad.

In the month before admission he had been given repeated injections of anahæmin without benefit. The administration of folic acid after his admission to hospital led to an immediate hæmatological and clinical improvement. The total period of folic-acid therapy for initial treatment and maintenance purposes was six months.

After discharge from hospital the patient was kept under observation, no folic acid or liver therapy being given for four months. He was then readmitted to hospital with swelling of the ankles, burning pain in the soles of the feet, tingling and numbness of both hands, weakness of the legs, looseness of the bowels, and a reduction in the red-cell count from 5,000,000 to 4,000,000 per c.mm. Peripheral neuritis was diagnosed because of muscular weakness and wasting, hyperalgesia on pressure of muscles and nerve trunks, and weakness or loss of reflexes in both arms and legs. In addition a diagnosis of idiopathic steatorrhœa was made from naked-eye and chemical examination of the stools and a pronounced impairment of fat absorption (40% against a normal figure of 90–95%) as estimated by the fat-balance method of Cooke et al. (1946).

The patient was then given folic acid 10 mg. daily by mouth. The burning pain in his feet disappeared, but the patient's neurological condition steadily deteriorated despite five intramuscular injections of thiamine 25 mg. followed by thiamine 10 mg. daily by mouth, the folic acid being continued. During the next five months the patient continued taking folic acid, supplemented periodically with thiamine by mouth and by injection. At the end of this period, in addition to profound muscular weakness and wasting and complete loss of reflexes in the arms and legs, he had severe impairment of sensation in various situations and ataxia. At no time was an extensor plantar response found. Of great interest was the development of angular stomatitis and itching of the scrotum. A second fat-balance test showed an improvement of fat absorption (77%), while the red-cell count at no time fell below 4,000,000 per c.mm.

Treatment with 50 mg. of thiamine daily intramuscularly gave no benefit, so the folic acid was supplemented with parenteral liver, the patient receiving 4 ml. of anahæmin daily for the first few days and then less frequently. This was followed by steady subjective and objective improvement in motor power, coördination, and sensation, with return of certain reflexes which had previously been absent.

The important points in this case may be summarised as follows. A patient with idiopathic steatorrhœa developed a mild peripheral neuritis. Treatment with folic acid coincided with a steady deterioration of neurological features despite improvement of assimilation from the alimentary tract and the oral and parenteral administration of large amounts of thiamine. In addition, signs of deficiency of riboflavine developed. Beneficial results were produced only when folic acid was supplemented by intensive parenteral liver therapy.

Case 4.—A man, aged 39, had complained of diarrhœa for two years, but had at no time passed blood or mucus in the stools. He had served in the Army in North Africa, where he had had mild diarrhœa. Repeated stool examinations for ova and cysts had been negative.

In January, 1947, he was found to have a macrocytic anæmia, with a Hb of 70%, red-cell count 2,610,000 per c.mm., and C.I. 1·34. Treatment with proteolysed liver produced a rapid improvement, the Hb increasing to 92% and red-cell count to 4,110,000 per c.mm. in twenty-nine days. A laparotomy was done because of continued flatulence, pain, diarrhœa, and abnormal radiological findings in the colon. A partial colectomy was done for megacolon. Thereafter he continued on proteolysed liver for twenty-one days, followed by folic acid 20 mg. daily by mouth for the next twenty days.

While undergoing folic-acid therapy, the patient began to feel pins-and-needles in his arms and legs. At this time the red-cell count was about 4,000,000 per c.mm. Folic acid was discontinued, but the paræsthesia got worse, and fourteen days later power was lost in the arms and legs. The patient was accordingly admitted to our care in hospital when the following neurological features were found:

Motor: Wasting of the interossei muscles in the hands and of the left sternomastoid. Muscular weakness of both legs and arms and of both sternomastoid muscles.

Sensory: Hyperalgesia distally, more so in the legs than the arms. Tactile hypo-æsthesia on the lateral aspects of the lower third of both legs.

Reflexes: Knee-jerks and ankle-jerks weak. Triceps and brachioradialis reflexes absent. Biceps-jerk present. Plantar responses normal.

Sprue was diagnosed on the naked-eye appearances and chemical analysis of the fæces and on a fat-balance test (absorption only 62·4%). He was treated by us with proteolysed liver by mouth, supplemented with intramuscular injections of thiamine and riboflavine and nicotinic acid by mouth. The symptoms and signs of peripheral neuritis steadily improved, though the diarrhœa persisted.

Case 5.*—A nursing sister, aged 28, developed sprue in India in March, 1946. She was treated with liver and returned to Great Britain in December, 1946. Her health was then good until April, 1947, when she had a recurrence of diarrhœa, with pale bulky stools and much flatulence. At the end of May she was passing three or four bulky stools each day and had slight soreness of the tongue. Her red-cell count was 3,720,000 per c.mm., Hb 78%, C.I. 1·05, M.C.V. 86 c.μ.

* We are indebted for this case-record to Dr. Kenneth Chalmers, M.R.C.P.E., formerly house-physician to one of us (L. S. P. D.).

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Folic acid was given by mouth in a dosage of 50 mg. daily. The intestinal symptoms responded rapidly to this therapy. A week after the start of folic acid a fiery red rash of butterfly distribution appeared on her face. She also had a slight cheilosis, and her tongue became raw and painful during the exacerbations of her dermatitis. The backs of her hands were scaly, but there was no reddening of the skin. Another prominent feature was an intensive mental depression. No relief was obtained from the administration of nicotinic acid, but combined therapy with folic acid and parenteral liver caused the dermatitis to subside in four days. After six weeks' combined therapy, liver injections were discontinued and the dermatitis recurred. Folic acid was now discontinued, and the dermatitis improved in a week. Subsequent therapy was with parenteral liver alone, and there was no recurrence.

DISCUSSION

In these cases some features of vitamin deficiency developed during the administration of folic acid (pteroylglutamic acid), or increased in intensity after treatment began. The question arises whether these features were due solely to a direct deficiency of missing vitamins or were initiated or increased by an antagonistic effect of folic acid. In the sprue syndrome it is well known that, because of malabsorption, a wide variety of vitamin and mineral deficiencies can occur. Peripheral neuritis has not infrequently been reported, but subacute combined degeneration of the cord is stated to be very rare. Our experience of a large number of cases seen at home and abroad has been that peripheral neuritis is uncommon in the sprue syndrome. When present it is usually mild and disappears coincidentally with control of the diarrhœa and improvement in the general health. The peripheral neuritis present in cases 3 and 4 was unusually severe. Moreover, in case 3 the peripheral neuritis increased in severity while folic acid was being given, though the general alimentary symptoms were improved.

Weir and Comfort (1947), describing the failure of folic acid to influence the clinical course of non-tropical sprue, noted a "peculiar generalised paralysis" in one of the patients who was taking 15 mg. of folic acid by mouth each day. No neurological details are given, and no comment is made about the occurrence of paralysis in non-tropical sprue.

The features reported above might be held to support the view that, by some antagonistic action, folic acid had augmented a latent state of vitamin deficiency. Signs of involvement of the nervous system have appeared in only 2 out of 14 cases of the sprue syndrome in adults treated by us with folic acid—a much lower proportion than in pernicious anæmia.

The fact that folic acid can lead to a well-marked improvement of the hæmatological picture in pernicious anæmia concomitantly with the development of neurological features suggests that the clinical features of this disease are caused by a deficiency of several factors. It does not follow, however, that the neurological features are necessarily the result of vitamin imbalance, since their development could be explained by a direct deficiency of a neurotrophic factor which is not present in folic acid. On the other hand, it could be argued that the pronounced rise in incidence of involvement of the nervous system in pernicious anæmia treated with folic acid alone, and the rapidity and intensity of the involvement in some cases, support the view that folic acid exerts some action antagonistic to other members of the vitamin-B complex. Further evidence of such an antagonistic action has been reported by Ross et al. (1948). They claim that subacute combined degeneration of the cord develops more frequently and more severely in cases of pernicious anæmia treated with folic acid in doses of 10 mg. or more daily than in those receiving 5 mg. or less daily, and that 11 out of 21 of their patients developed or showed progression of subacute combined degeneration of the cord while on treatment with folic acid. We have found neurological changes in 8 out of 20 cases of pernicious anæmia treated with folic acid alone, and several other series of papers reviewed by Sargent (1947) give figures up to 25%. Though it is generally agreed that changes in the peripheral nerves usually precede involvement of the cord, such a widespread and rapid paralysis as reported in case 1 is in our experience exceptional.

Before, however, it could be accepted that such signs of neurological involvement were the result of vitamin imbalance and not due to direct vitamin deficiency, it would be necessary to compare the incidence and severity of neurological features in patients with the sprue syndrome or with pernicious anæmia treated with folic acid with a series of similar patients treated before the introduction of liver therapy in 1926. For reasons suggested below, patients treated with liver or liver extract, even in inadequate amounts, would not constitute suitable controls for this purpose.

We would like to put forward the suggestion that purified parenteral liver extracts may contain a substance which enhances the absorption or utilisation or facilitates the liberation from an inactive state of various members of the vitamin-B complex. The following observations support this hypothesis. A single injection of 1 or 2 ml. of a highly purified liver extract which contains insignificant traces of any member of the vitamin-B complex produces the most dramatic effects on a wide variety of features of vitamin deficiency—e.g., glossitis, stomatitis, anorexia, diarrhœa, peripheral neuritis, subacute combined degeneration of the cord, anæmia, &c. There is evidence that the potent material in purified liver extract acts, in so far as folic acid is concerned, by facilitating its utilisation or its liberation from its conjugated form in food. It seems to us possible, therefore, that liver extract may act in a similar way in relation to other members of the vitamin-B complex. If this is correct, the reason why liver extract prevents the occurrence of neurological features in pernicious anæmia does not depend on its containing some hypothetical neurotrophic factor but on its capacity to liberate this factor from its inactive form in food or to facilitate its absorption or its utilisation. This hypothesis could be tested by estimating the concentration of various members of the vitamin-B complex in the blood and urine before and after the injection of purified liver extract. It would also be interesting to compare the figures with those obtained after the administration of folic acid.

From what has been said it is clear that it would be unwise to come to any final conclusion about whether the signs of deficiency which may arise in patients with the sprue syndrome or with pernicious anæmia treated with folic acid are the result of vitamin imbalance or are due simply to a direct deficiency of missing factors which have not been supplied. From a practical and clinical point of view, however, it is clear that the administration of liver or of liver extract will prevent the occurrence of certain features of vitamin deficiency and alleviate or cure them if they are established. Since the treatment of pernicious anæmia with parenteral liver is exceedingly simple and successful, there seems to be no place for folic acid, except possibly for short temporary periods for patients who are on holiday or have become sensitised to liver extract and are awaiting desensitisation. In the sprue syndrome, however, especially in tropical sprue, the dramatic effects which folic acid may have on the alimentary symptoms make it a valuable therapeutic agent. Since we have shown, however, that coincident with its use serious signs of vitamin deficiencies may arise which can be cured by the administration of liver or liver extract, we suggest that the treatment of the sprue syndrome should consist of dietary therapy supplemented with both folic acid and liver or liver extract.

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SUMMARY

In 2 patients with pernicious anæmia and 3 with sprue treated with folic acid various signs of deficiency of the vitamin-B complex arose. These signs did not improve until folic acid was supplemented with, or superseded by, liver or liver extract.

The question whether these signs were due to a direct deficiency of the missing factors or to vitamin imbalance is discussed.

It is suggested that purified liver extract for parenteral use may contain a factor which liberates various members of the vitamin-B complex from their inactive form or facilitates their absorption or their utilisation in some way not yet understood.

Treatment of the sprue syndrome should consist of dietary therapy supplemented with both folic acid and liver or liver extract.

REFERENCES

Bichel, J., Meulengracht, E. (1941) *Klin. Wschr.* **20**, 913.
Braendstrup, P. (1940) *Ugeskr. Laeg.* **102**, 95.
Cooke, W. T., Elkes, J. J., Frazer, A. C., Parkes, J., Peeney, A. L. P., Sammons, H. G., Thomas, G. (1946) *Quart. J. Med.* **15**, 141.
Davidson, L. S. P., Girdwood, R. H. (1947) *Brit. med. J.* i, 587.
Lehmann, J., Nielsen, H. E. (1939) *Nord. Med.* **1**, 289.
Moore, T. (1945) *Vitamins and Hormones*, **3**, 1.
Richards, M. B. (1945) *Brit. med. J.* i, 433.
Ross, J. F., Belding, H., Paegel, B. L. (1948) *Blood*, **3**, 68.
Salvesen, O. (1940) *Nord. Med.* **5**, 279.
Sargent, F. (1947) *New Engl. J. Med.* **237**, 703.
Sebrell, W. H., Butler, R. E. (1938) *Publ. Hlth Rep., Wash.* **53**, 2282.
— — (1939) *Ibid*, **54**, 2121.
Spies, T. D., Vilter, R. W., Ashe, W. F. (1939) *J. Amer. med. Ass.* **113**, 931.
Sydenstricker, V. P., Sebrell, W. H., Cleckley, H. M., Kruse, H. D. (1940) *Ibid*, **114**, 2437.
Weir, J. F., Comfort, M. W. (1947) *J. Lab. clin. Med.* **32**, 1231.

MELIOIDOSIS

TREATED WITH SULPHONAMIDES AND PENICILLIN

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IT is difficult to assess the value of any form of treatment of melioidosis because of its rarity, the fact that it has so seldom been diagnosed before death, and the extreme variations in the course and severity of different cases (Stanton and Fletcher 1932). We have read only five reports of cases receiving more than symptomatic treatment and know of none treated with penicillin.

Grant and Barwell (1943) first showed the effects of sulphonamides on melioidosis:

A regular soldier, after three years' service in Malaya, developed localised osteomyelitis of the left frontal bone and both external malleoli, and later a large circumspinal abscess with vertebral destruction. *B. whitmori* was isolated in pure culture.

Sulphathiazole temporarily reduced the pyrexia but did not keep the patient afebrile. Sulphapyridine was apparently successful but too toxic. Sulphadiazine produced an immediate response, but pyrexia returned after the course.

Mayer and Finlayson (1944) treated another soldier who had served in the Far East:

Nearly three years after the illness began, the diagnosis was made when *B. whitmori* was found in pus from a sacro-iliac abscess. Improvement followed sulphadiazine and vaccine therapy.

Mirick et al. (1946) showed that *B. whitmori* was sensitive to sulphonamides but not to ordinary concentrations of penicillin.

The five cases described here occurred in West African soldiers in Burma during 1946.

Case 1.—A man, aged 49, was admitted at the end of March, 1946, with two weeks' history of pain in the right hypochondrium. He had high fever, enlargement and tenderness of the liver, and jaundice. Urine, fæces, and blood showed nothing abnormal. No blood-culture was done. There was no response to emetine or, later, to sulphathiazole (2 g. followed by 1 g. four-hourly), and he died on April 12.

Necropsy Findings.—Multiple abscesses in liver (fig. 1) and spleen. Liver greatly enlarged (107 oz.). Hepatic abscesses, varying in size from that of a match-head to 3 cm. in diameter, were loculated and contained greenish-yellow pus. Most of them were in groups on the surface. They appeared to have a fibrous capsule. Splenic abscesses were similar, and rest of spleen was surprisingly firm, with no obvious increase in trabeculæ.

A pure growth of *B. whitmori* (*Malleomyces pseudomallei*) was obtained from the pus of both liver and spleen. The histological findings were characteristic of the disease. The abscesses showed a central necrotic core surrounded by a zone of polymorphs; peripheral to this was a hyperæmic area with large dilated capillaries, many plasma cells, and little connective tissue. No giant cells were seen.

Case 2.—A man, aged 28, had been admitted on March 7, 1946, to a casualty-clearing station with cough, mucopurulent sputum, fever, and clinical evidence of a lesion in the right lung. Courses of sulphathiazole and sulphadiazine (2 g. followed by 1 g. four-hourly) had produced no satisfactory response.

White-cell count 12,000 per c.mm. (neutrophils 72%).

Sputum: on ten separate occasions no acid-fast bacilli had been found.

March 17: liver had been enlarged and tender; urine had contained bile pigments; radiography of chest had shown extensive infiltration of right lung, with apparent cavitation in right upper zone.

April 15: patient was transferred to this hospital as a case of lung abscess.

On admission temperature 103·4°F, pulse-rate 105, respirations 40 per min., condition poor.

April 17: white-cell count 7500 per c.mm. (neutrophils 66%). Sputum culture: no pathogenic organisms isolated. Blood-culture sterile.

Courses of 'Sulphamezathine' 2 g. followed by 1 g. four-hourly, and penicillin 40,000 units three-hourly, given separately, each for five days, produced no response. Patient died on May 5.

Necropsy Findings.—Right lung completely consolidated; multiple abscesses 1–6 cm. in diameter present at apex, containing greenish-yellow pus and surrounded by thin necrotic walls, inner surface of which was coated with soft caseous material. Rest of lung, on section, showed an arborescent arrangement of necrotic yellow tissue, very hæmorrhagic in places. Left lung contained three patches of consolidation, with an abscess in the centre of each. Liver and bowel showed no abnormality.

B. whitmori was isolated in pure culture from lung abscesses. Histological picture essentially the same as that seen in case 1.

Case 3.—A man, aged 30, was admitted on May 9, 1946, with malaise and fever.

On examination only lesions found were a few pustules on forehead and trunk. There was an irregular pyrexia (fig. 2).

May 14: papules appeared on forearms and vesicles on back. A diagnosis of secondary syphilis was considered.

May 20: a tender swelling, 1 in. across, appeared on forehead, and was fluctuant three days later. Hb 54%. White cells 5400 per c.mm. Chest radiogram normal.

May 30: urine culture produced a pure profuse growth of *B. whitmori*. Serum agglutination test (*B. whitmori*): titre 1/80.

May 31: forehead abscess aspirated; *B. whitmori* isolated in pure culture.

At this time the synergic action of sulphonamides and penicillin in vitro (Bigger 1946) was brought to our notice, and in view of our previous fatal cases it was felt that the heroic dosage advised for typhoid fever might be of value in melioidosis.

Treatment adopted: sulphathiazole four-hourly, two doses of 2 g. followed by doses of 1 g., and penicillin 250,000 units three-hourly for four days, to a total of 32 g. and 10,000,000 units respectively. A favourable response was noted after 72 hours, and next day the temperature was normal.

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June 11: urine sterile.
June 12: urine sterile; abscess on forehead incised; pus gave scanty *B. whitmori* on culture.
June 13, 14, and 15: urine cultures showed an increasing number of *B. whitmori* colonies. Patient's condition deteriorating, with recrudescence of fever.
June 15: course of sulphathiazole and penicillin restarted, and continued for ten days, to a total of 60 g. and 20,000,000 units.
June 16: urine sterile.
June 20: patient afebrile; forehead incision now healed and general condition good.
June 30: further relapse, with evening temperature 104°F; urine sterile.
July 2: painful swelling 1 in. in diameter on right forearm. White cells 6500 per c.mm. (neutrophils 78%).
July 3: forearm swelling fluctuant; aspirated; *B. whitmori* isolated.
At this stage in-vitro experiments showed no effective synergic action of the drugs, and it was decided to try sulphamezathine alone.
A course of sulphamezathine 2 g. four-hourly was started, with two loading doses of 4 g., and continued for ten days to a total of 120 g.
During this course a further abscess developed over the left biceps. It was aspirated, and the pus gave a moderate growth of *B. whitmori*.
From July 10 to Aug. 10 daily urine cultures proved sterile.
July 16: recurrence of pyrexia.
July 18: course of sulphamezathine 2 g. four-hourly to 66 g. only, because of neutropenia (white cells 3000 per c.mm.).
Aug. 8: brawny swellings developed in right axillary fold and at right elbow. Course begun of sulphamezathine 2 g. four-hourly to a total of 66 g. (white cells 5000 per c.mm.).
Aug. 10: abscesses at axilla and elbow opened under thiopentone. Pus gave pure profuse growth of *B. whitmori*.
Aug. 25: swelling above right knee.
Aug. 29: abscess above right knee opened under thiopentone. This abscess was situated beneath the deep fascia. The pus gave a scanty growth of *B. whitmori*.
Sept. 6: course begun of sulphamezathine 2 g. four-hourly to a total of 90 g. in eight days.

All but one of the abscesses were subcutaneous and did not affect the lymph-glands. We now think that penicillin should have been injected into the abscess cavities after aspiration. Sera agglutination tests at regular intervals showed no rise in titre beyond the 1/80 originally recorded. The possibility of a renal focus was considered but rejected, since urine cultures remained sterile after June 15. All blood-cultures were sterile. A significant leucocytosis was not recorded in this case, nor was it a feature in the others. The patient was evacuated by hospital ship to West Africa in late September. A vaccine, made from the organism of case 5, was administered in doses of 50,000 organisms every three days for 4 doses and continued on board the ship (Peck and Zwanenburg 1947). One abscess had to be opened on board ship, but the patient arrived well in October.

Case 4.—A man, aged 29, was admitted on April 1, 1946, with four days' history of cough and substernal pain. Tracheobronchitis was diagnosed. General condition good.
April 11: chest radiogram showed increased density of both mid-lung zones, with cavitation on the left side. Six sputum examinations in fourteen days showed no acid-fast bacilli.
Radiography on April 27 and May 4 showed progression of lesions in chest.
May 18: serum agglutination test (*B. whitmori*): titre of 1/20. Blood-culture: contaminated; no *B. whitmori* isolated.
May 24: patient running an irregular fever; condition deteriorating.
May 27: course begun of penicillin 40,000 units three-hourly to a total of 4,160,000 units in fourteen days. No effect on fever.
May 29: serum agglutination test: titre 1/160. White cells 6000 per c.mm. (neutrophils 42%, lymphocytes 54%).
May 30: *B. whitmori* isolated from sputum for first time.
June 5: serum agglutination test: 1/640.
June 10: pure culture of *B. whitmori* obtained by direct plating of sputum.
June 13: course begun of penicillin 250,000 units three-hourly and sulphathiazole 2 g. four-hourly to a total of 20,000,000 units and 67 g. in ten days. Pyrexia controlled after 36 hours.
June 20: sputum culture produced no *B. whitmori*. Henceforth daily cultures were done, and on July 11, 24, 25, and 26 *B. whitmori* was again found in the sputum.
July 2: patient developed amœbic dysentery, which was treated with emetine, emetine-bismuth-iodide, and quinoxyl enemas.
July 24: course begun of sulphamezathine 2 g. four-hourly to a total of 160 g. in thirteen days, because of positive sputum.
July 26: chest radiogram showed right lung clear; left lung still apparently much congested; no cavity seen.
Patient was repatriated at end of August and he arrived well five weeks later. Twenty-one daily sputum examinations after July 26 gave no growth of *B. whitmori*. Radiogram and clinical examination of the chest were normal on Oct. 4, 1946. This man was alive and well in August, 1947.

Case 5.—A man, aged 23, was admitted to this hospital on Feb. 4, 1946, with fever and a productive cough. A small hæmoptysis had occurred in January, 1946.

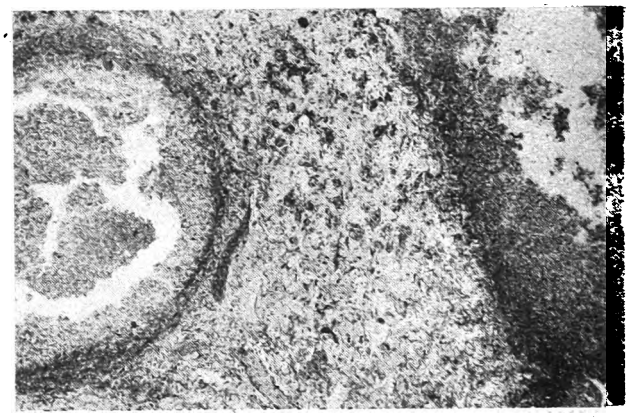

Fig. 1—Liver, from case 1, showing parts of two large abscess cavities with œdematous vascular granulation tissue between. The walls consist of granulation and fibrous tissue, and the cavities contain polymorph exudate. Gram-stained sections did not show bacteria. (× 50.)

Feb. 5: chest radiogram showed a patch of consolidation in right upper zone, with central irregular translucency, suggesting a cavity. There were no abnormal physical signs. Three sputum examinations showed no acid-fast bacilli. In due course the cough cleared.
March 2: chest radiogram still showed likely cavitation, but surrounding opacity was less pronounced. The patient was kept under observation.
May 17: chest radiogram showed definite cystic change on right. Cough and chest pain were now complained of.
May 24: cystic appearance on radiography more pronounced. Still no physical signs. Four sputum examinations revealed no acid-fast bacilli.
June 7: blood-culture proved sterile.
June 9: patient now producing 6–8 oz. of purulent sputum daily. Hb 90%, red cells 4,400,000 per c.mm.; white cells 8000 per c.mm. (neutrophils 50%); erythrocyte-sedimentation rate 42 mm. in one hour (Wintrobe). Urine: no abnormal findings. Serum agglutination test (*B. whitmori*): titre 1/1280.
June 17: serum agglutination test: titre 1/1280.
June 18: chest radiogram now showed a large cavity occupying the site of the previous lesion.
June 21: sputum culture produced a pure profuse growth of *B. whitmori* on blood-agar plate treated with penicillin 5 units per c.cm.
Treatment adopted: 250,000 units of penicillin three-hourly and sulphamezathine 1 g. four-hourly for ten days.
June 26: patient had a hæmoptysis of about 2 oz.
June 28: chest radiogram now showed an obvious large thick-walled cavity in right lung (fig. 3); lateral view showed cavity situated anteriorly.
In view of the radiograms it was considered that local penicillin in high dosage into the cavity would be beneficial. In-vitro experiments showed that, to affect materially the

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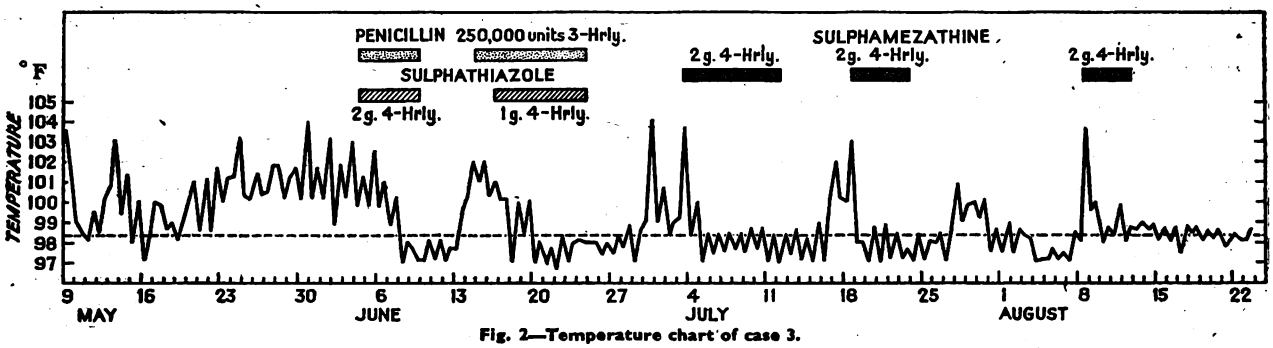

Fig. 2—Temperature chart of case 3.

growth of the organism, at least 650 units of penicillin per ml. was necessary.

June 29: penicillin 300,000 units in 6 ml. of saline was injected into the lung cavity.

July 2: since lung puncture, patient produced only a small amount of mucoid sputum daily. White cells 6700 per c.mm. Hb 90%.

From July 3 to July 19 daily sputum cultures had not produced any *B. whitmori*.

July 20: one colony only of *B. whitmori* isolated from sputum. Because of this, it was decided to give a further course of sulphamezathine.

July 24: course begun of sulphamezathine 2 g. four-hourly to a total of 160 g. in thirteen days.

July 30: chest radiogram showed that the large cavity in right lung was no longer visible.

This was in all respects a most satisfactory case. In spite of the high resistance of the organism, local instillation of penicillin was followed by considerable improvement. The patient was repatriated in good health at the end of August after five weeks' symptom-free observation. He was well when he arrived in West Africa five weeks later. Chest radiogram normal on Oct. 4, 1946.

BACTERIOLOGY

The final diagnosis of melioidosis depends on the recovery of *B. whitmori*. It is worth while to draw attention once more to the fact that the organism may be discarded as a contaminant. All cultures performed in this series were kept in the incubator for at least 48 hours. Helpful characteristics are the typical button shape of the colonies and aromatic odour of cultures.

Strains 1 and 2* were typical, but strain 2 did not ferment sugars in occasional subcultures.

Penicillin-treated plates were useful in isolating *B. whitmori*, but were not essential for routine cultures.

The corrugated appearance of colonies after four days' incubation was well marked and upheld Nicholls's suggestion that this is the virulent state. In fact, after repeated subculture the organisms lost this property and at the same time lost their ability to produce the Strauss reaction. Viable strain-2 organisms were cultured from pus which had been obtained at necropsy and kept in the cold for four months. Culture of this pus at regular intervals revealed a slow diminution in virulence and rough-colony formation.

At no time did strains 3, 4, and 5 show the degree of corrugation noted in strains 1 and 2. This suggested less virulence and perhaps may be correlated with the less profound toxæmia in these patients. After continued therapy the organism from case 3 lost its ability to form corrugated colonies.

Agglutinable suspensions of strain 2, made by the method advocated for *B. proteus* suspensions (Bridges 1944), were used throughout the series. The Felix method was used, and the titre recorded as the last tube showing agglutination. The end-result was always well marked.

Control tests were carried out on other sera: syphilis 40; infective hepatitis 4; tuberculosis of lung 2; other fevers 10. In no instance did controls give a higher titre than 1/20. Most were recorded as nil. We are of the opinion that a titre of 1/80 is significant, and a titre of 1/160 almost certainly diagnostic.

* The strains are numbered according to the cases from which they were derived.

EPIDEMIOLOGY

These cases came from West African units stationed at different points between Prome and Rangoon in 1946. One of us saw one other case among them in Arakan in 1945. As there were never more than 30,000 West Africans in these areas the incidence was high, which we cannot explain. The Africans lived in much the same way as the Indian troops and Burmans, and mixed freely with them.

Melioidosis in Burma has previously only been reported in Rangoon.

We have not found the disease in rats in the Rangoon area, though more than 500 were examined.

COMMENTS

Melioidosis varies in severity from a fulminating disease, often choleraic and rapidly fatal, to one of slow suppuration in one or two sites.

Sulphonamides should benefit all types of case if they can be given early enough. Those cases not recognised

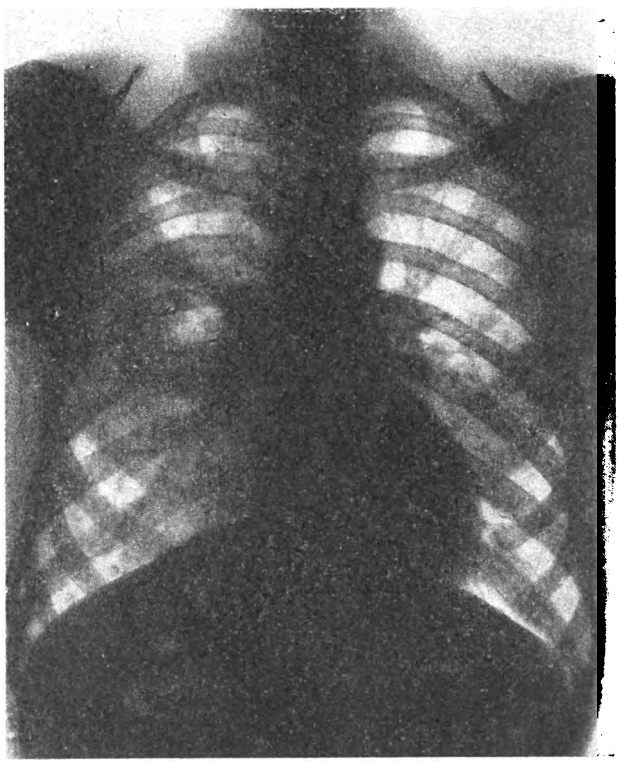

Fig. 3—Radiogram (June 28) showing large thick-walled cavity in right lung (case 5).

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until multiple abscesses have formed in vital organs are not likely to respond to the present means of therapy.

We believe that cases in which suppuration has occurred should be treated on these lines:

(1) Large doses of a sulphonamide for at least ten days. Sulphamezathine 2 g. four-hourly is effective and is by far the safest drug in hot climates.

(2) Treatment of all accessible abscesses by incision or aspiration and local penicillin.

(3) Active immunisation by a vaccine where there is no rise in titre.

Three patients treated on these lines did well, but only one could be followed for more than three months, a period too short for drawing definite conclusions.

Two cases of a more severe type did not respond to sulphonamides and penicillin. At necropsy multiple abscesses were found in the lungs of one and in the liver and spleen of the other.

SUMMARY

Five cases of melioidosis are described, two of them fatal; the necropsy findings are given.

Three cases responded well to chemotherapy.

The virulence of *B. whitmori* seems to vary considerably.

No definite conclusions can be drawn until many types of the disease can be treated and followed for a long time.

We wish to thank Dr. J. C. Cruickshank, of the London School of Hygiene and Tropical Medicine, for confirmation of the bacteriology of the first two cases; Dr. John Lowe, of the Calcutta School of Tropical Medicine, for allowing access to previous literature; Major L. H. Nugent, I.A.M.C., for copies of the radiograms; Dr. A. A. Miller for the photomicrograph and attached legend; Lieut.-Colonel C. R. Peck, late A.D. pathology, Burma, for his unflagging interest and advice; Major A. Ritchie, R.A.M.C., for his notes on case 2; the West African hospital orderlies who throughout maintained accurate four-hourly charts; Colonel C. S. Gross, R.A.M.C., O.C. General Hospital and the D.M.S., S.E.A.L.F., for permission to publish; Major J. B. Borthwick, R.A.M.C., for details of the examination of cases 4 and 5 when they arrived in Lagos; and the District Officer, Katsina Division, for tracing case 4.

REFERENCES

Bigger, J. W. (1946) *Lancet*, i, 81.
Bridges, R. F. (1944) *Trans. R. Soc. trop. Med. Hyg.* **37**, 343.
Grant, A., Barwell, C. (1943) *Lancet*, i, 199.
Mayer, J. H., Finlayson, M. H. (1944) *J.R. Army med. Cps*, **82**, 4.
Mirick, G. S., Zimmerman, H. M., Maner, G. D., Humphrey, A. A. (1946) *J. Amer. med. Ass.* **130**, 1063.
Peck, C. R., Zwanenburg, T. (1947) *Brit. med. J.* i, 337.
Stanton, A. T., Fletcher, W. (1932) Melioidosis. London.

MYANESIN IN HYPERKINETIC STATES

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'MYANESIN,' α:β-dihydroxy-γ-(2-methylphenoxy)-propane, was first described by Berger and Bradley in 1946. A few weeks later its application to the production of muscular relaxation in anæsthesia was indicated by Mallinson (1947). The mechanism of this action, however, was far from clear. Berger and Bradley (1947) suggested that its main effect was on the spinal cord, because it inhibited strychnine convulsions, which are spinal in type, in smaller doses than those which affected the epileptiform convulsions which followed the injection of leptazol. Mallinson (1947) also commented on the dissimilarity between myanesin and curare in that myanesin induced relaxation of the abdomen without causing simultaneous intercostal paralysis. It has been clearly shown by Stephen and Chandy (1947) that myanesin has no action on the transmission of nervous impulses along nerve trunks, across myoneural junctions, or across the synapses of the spinal reflex arc.

When one of us (A. R. H.) first used myanesin in anæsthesia for abdominal surgery he was struck by the similarity of its immediate effects to those of thiopentone and nitrous oxide given in the manner suggested by Organe and Broad (1938). Further, patients were often a little drowsy for the first 24 hours after myanesin had been given. Myanesin also produced bradycardia and central respiratory depression, which may follow rather too large induction doses of thiopentone or of hexobarbitone. In one instance, where an alarming fall in blood-pressure developed in a sthenic patient after the injection of a large dose of myanesin, nikethamide not only restored circulatory stability but also completely abolished the muscle-relaxing effect of the myanesin.

These apparent similarities between myanesin and the barbiturates suggested that it might be worth while to investigate the action of myanesin in hyperkinetic states. The following observations were made:

(1) A man, aged 72, had been having almost continuous jacksonian epileptic attacks involving the right half of his body for 40 min. The left side was completely unaffected, and he had not lost consciousness. During the course of a convulsion myanesin 0·4 g. (about 8 mg. per kg.) was injected intravenously. Within 30 sec. the jerking ceased and his fits remained in abeyance for about 90 min. No alteration in his state of consciousness was produced by the myanesin. His subsequent attacks were treated with phenobarbitone.

(2) A hypertensive patient with encephalopathy developed a series of epileptiform convulsions 2 hours after a lumbar encephalogram. The fits recurred every 10 min. and lasted about 5 min. During the sixth fit myanesin 0·5 g. (about 7 mg. per kg.) was injected intravenously. He became immobile within 30 sec. and gradually recovered consciousness in the next few hours. He had no further convulsions.

(3) A patient with a subdural empyema was having recurrent epileptiform convulsions. He received 10 ml. of myanesin intravenously during an operation for his condition. This stopped the fits, and they remained absent for about 2 hours. When they returned, myanesin 0·5 g. stopped them for a further 2 hours. With the aid of intramuscular myanesin and an occasional dose of paraldehyde this patient was kept quiet for the duration of his illness, which terminated fatally 3 days after operation. When the myanesin was wearing off, he had twitching of his mouth and of his jaw muscles but no more fits. Myanesin had no effect on his state of consciousness.

(4) A woman of 56 with parkinsonism was about to have an operation for an incarcerated hernia. She had been premedicated with morphine gr. $^1/_6$ and atropine gr. $^1/_{100}$, but this had had no influence on her tremor. Just before the induction of anæsthesia myanesin was injected intravenously, but this had little apparent effect until 10 ml. had been given (26 mg. per kg.); her eyelids then drooped, and she said she felt drowsy and slightly dizzy. She could still answer questions and could open her eyes when asked to do so; the force of her grip was unaltered. She had nystagmus. Her tremor, which had become less after 8 ml. had been given, almost disappeared when the full dose had been injected. Three days later the same dose of myanesin was given intravenously to this patient. On this occasion, though drooping of the eyelids, drowsiness, and nystagmus were noted, there was only a very temporary reduction in the amplitude of her tremor.

DISCUSSION

Myanesin by mouth had no effect on the last patient; nor was it effective in controlling idiopathic epilepsy in an adult who was known to respond to phenobarbitone and soluble phenytoin ('Epanutin'). Possibly the drug is inactive when given by mouth because its destruction in the liver is so rapid that no appreciable quantity can pass unchanged from the portal to the systemic circulation.

The observation that myanesin stops fits within 30 sec. is also important. This interval is just a little in excess of the arm-brain circulation time (Hunter 1947) and is therefore presumptive evidence of a central rather than

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a peripheral action of myanesin. By way of contrast the action of curare, which is on the myoneural junctions, takes at least 90 sec. to become apparent. When an attempt is made to deduce which part of the brain is affected by myanesin, several difficulties arise. Stephen and Chandy (1947) have shown that myanesin produces temporary remission of parkinsonian tremor and pain of thalamic origin. In the present study it has become apparent that those parts of the brain concerned in epileptic activity are even more sensitive to the action of myanesin. On the other hand, myanesin does not diminish motor power; nor, according to Stephen and Chandy (1947), has it any influence on the normal electroencephalogram. It has relatively little effect on consciousness. The site of its action is therefore unlikely to be the cortex cerebri or the hypothalamic area; it is probably elsewhere in the basal ganglia.

The more immediate practical importance of the results recorded here seems to be that myanesin is a valuable agent for the arrest of recurrent epileptic fits. In larger doses it temporarily inhibits parkinsonian tremor. The facts that its action is relatively evanescent and that it is inactive when given by mouth might make it worth while to investigate some of the other substituted glycerol ethers to see if they might be useful in this field.

SUMMARY

Intravenous injections of myanesin were found to check epileptiform fits within 30 sec.

Since this time is a little longer than arm-brain circulation time, myanesin probably acts centrally.

Supplies of myanesin were generously provided by The British Drug Houses Ltd.

REFERENCES

Berger, F. M., Bradley, W. (1946) *Brit. J. Pharmacol.* **1**, 265.
— — (1947) *Lancet*, i, 97.
Hunter, A. R. (1947) *Brit. med. J.* i, 16.
Mallinson, F. B. (1947) *Lancet*, i, 98.
Organe, G., Broad, R. J. B. (1938) *Ibid*, ii, 170.
Stephen, C. R., Chandy, J. (1947) *Canad. med. Ass. J.* **57**, 463.

MYANESIN AS AN AID TO ANÆSTHESIA IN CHILDREN

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MUCH attention has been given during the past two years to the benefits accruing from anæsthetic techniques for abdominal surgery in which the patient is maintained at a light level of anæsthesia and the required muscular relaxation is achieved with drugs which are not anæsthetics.

At the Royal Aberdeen Hospital for Sick Children the properties of α : β - dihydroxy - γ - (2 - methylphenoxy)-propane ('Myanesin')[1] were investigated primarily to determine if it is effective and if it has any harmful effect on the patient. It was decided in the first place to use myanesin on patients in whom the variables could be adequately controlled and its true value assessed.

All the cases in this series, numbering about 60, were appendicectomies in children aged 3–12 years premedicated with atropine gr. $^1/_{100}$ three-quarters of an hour before operation. The patients were next anæsthetised with nitrous oxide, oxygen, and ether and were intubated orally with the largest Magill tube which could conveniently be passed. This was lubricated with 10% 'Nupercaine' paste applied sparingly. The anæsthesia was then lightened and stabilised in lower plane 1. As would be expected, at this level the abdominal muscles were not adequately relaxed; and, when the surgeon reached the peritoneum, myanesin was slowly injected intravenously. The dose of myanesin was based on the age of the child by the formula: $\frac{\text{Age}}{2}$ + 1 ml. Thus a child aged 8 years received 5 ml. This system of dosage, though admittedly not so scientific as one based on body-weight, was considered satisfactory in view of the wide safety margin of myanesin.[2]

RESULTS

Relaxation.—In most cases relaxation of the abdominal muscles came on within a minute and lasted for 7–15 min., after which it passed off fairly rapidly. In toxic cases with a high temperature this relaxation passed off more rapidly, presumably because of the increased metabolic rate. A further injection of myanesin, usually about half the initial dose, again relaxed the muscles, this time for a longer period up to 30 min. In 3 cases relaxation was not complete with the standard dosage, but a slight deepening of the anæsthesia brought on excellent relaxation. Good relaxation was always achieved with less general anæsthetic than if myanesin had not been used.

Side Effects.—To detect any deleterious effects, all cases were carefully charted on Nosworthy record cards. Analysis of these did not show any significant change in pulse-rate or in blood-pressure, and the only change noted in respiration was a response to stimulation from the field of operation, which confirmed the light level of anæsthesia. Despite lowered tone of the abdominal muscles there appeared to be no diminution of intercostal or diaphragmatic activity and no alteration in the character of the respiration. This is difficult to understand, since morphologically the abdominal and intercostal muscles are identical; but clinically this observation appears to be accurate.

Urine was examined routinely both before and after operation, and no abnormal constituents were detected. Urea-clearance tests, made to determine if there was any interference with normal renal function, showed no deviation from normal.

Postoperative Complications.—None of the children had any postoperative complications attributable to the anæsthetic except one who had a painless non-inflammatory venous thrombosis extending from the antecubital fossa to the upper arm but not involving the veins in the axilla. In this case myanesin had been more rapidly injected than usual. All the patients were examined postoperatively for the presence of thrombosis. Recovery from anæsthesia was rapid, and postoperative sedation was required early, usually immediately on return to the ward.

HÆMOLYSIS

In view of a somewhat alarming report of excessive hæmolysis combined with hæmoglobinuria in a case in which myanesin had been used,[3] tests were carried out in which all precautions against artificial hæmolysis were taken. Samples of blood were collected (1) before induction; (2) after induction with nitrous oxide, oxygen, and ether; and (3) after administration of myanesin to the anæsthetised patient. In no case was there any hæmolysis before anæsthesia. After the patient was anæsthetised with nitrous oxide, oxygen, and ether, very slight hæmolysis was noted, with a slight increase in fragility of the red cells. When in addition myanesin was used, there was a considerable increase in hæmolysis and a definite increase in fragility of the red cells. One must conclude that, in all cases where myanesin is introduced into the blood-stream, there is some degree of intravascular hæmolysis; but in the present series, whether because of a high renal

1. Berger, F. M., Bradley, W. *Brit. J. Pharmacol.* 1946, **1**, 265; *Lancet*, 1947, i, 97.

2. Mallinson, F. B. *Lancet*, 1947, i, 98.
3. Pugh, J. J., Enderby, G. E. H. *Ibid*, 1947, ii, 387.

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threshold to hæmoglobin or because the intravascular hæmolysis was slight, no hæmoglobin was detected in the urine postoperatively either by naked eye or spectroscopically. In view of the completely negative postoperative clinical findings, combined with the absence of abnormal urinary constituents and with uncomplicated convalescence, it was felt that the degree of hæmolysis was so small that the further use of myanesin was justified. Nevertheless, the factors causing hæmolysis should certainly be investigated further.

MYANESIN AND SOLUBLE THIOPENTONE

A further 40 cases have since been completed in which myanesin was used as the relaxing agent in conjunction with soluble thiopentone ('Intraval' or 'Pentothal'), nitrous oxide, oxygen, and in several cases cyclopropane. In these cases relaxation was undoubtedly obtained at a lighter level of anæsthesia than would have been possible with these agents alone. When the thiopentone, nitrous oxide, oxygen technique was used, myanesin increased the duration of the effect of the anæsthetic without deepening it. This was particularly noted on return to the ward, when the administration of the postoperative sedative was unnecessary for a considerable time. This is the converse of what happens when the general anæsthetic is nitrous oxide, oxygen, and ether, myanesin apparently having no potentiating effect when ether is used. Irrespective of the anæsthetic agent chosen, the incidence of postoperative vomiting was lower than where myanesin had not been used.

GIVING INTRAVENOUS DRUGS TO CHILDREN

Even in the very young the veins in the antecubital fossa, though small, are remarkably easy of access. Very often the veins on the dorsum of the hand, wrist, and round the internal malleolus are of surprisingly large calibre; and, though normally a sharp fine-bore hypodermic needle (size 16) is used, a 'Gordh' needle has on occasion proved useful. Particular care must be taken in children to avoid intra-arterial injection.

SUMMARY

Observations have been made on 100 cases of appendicectomy in children aged 3–12 years given myanesin as a relaxing agent in addition to nitrous oxide, oxygen, and either ether or thiopentone (a few cases received cyclopropane).

In patients lightly anæsthetised myanesin was found to relax the abdominal muscles satisfactorily.

In patients anæsthetised with the intravenous barbiturates myanesin increased the duration of anæsthesia without increasing its depth.

Myanesin had no demonstrable postoperative ill effects on the patients.

Venous thrombosis occurred in only one case, where it was probably due to too rapid injection.

On naked-eye and spectroscopic examination no hæmoglobinuria was detected, although it was confirmed that there is definite hæmolysis and increased red-cell fragility in the blood after the administration of myanesin.

Preliminary Communication

THE NICOTINIC-ACID TOLERANCE TEST

NICOTINIC acid given by mouth is converted in the liver into nicotinamide by aminisation of the CO.OH group into $CO.NH_2$. The quantity of nicotinic acid in excess of the liver's aminising capacity reaches the systemic circulation and causes vasodilatation. The threshold quantity is about 100 mg. in health, and is very much increased in hepatocellular lesions and in certain other pathological conditions. The nicotinic-acid tolerance test (N.T.T.) indicates the aminising capacity of the hepatic parenchyma.

The patient is given a loading dose of 200 mg. (or 300 mg. when increased tolerance is expected); then, if there is no reaction in 10 min., 100 mg. is given every 10 min. until a burning or prickly sensation is felt and the face flushes. This standard technique has been used in most of the cases reported here. When the amount of nicotinic acid given exceeded 1000 mg., the test was interrupted and resumed next day with 1000 mg. as the loading dose. In some cases of pulmonary tuberculosis it was necessary to modify the technique by giving daily increasing doses until the limit of tolerance was reached.

The values obtained by the two different techniques are not strictly comparable. Nicotinic acid is excreted very rapidly, and the recovery of the liver's aminising capacity is also quick. Thus the standard technique gives higher values than does the method with daily increasing doses; the difference is about 100 mg. at a N.T.T. value of 600 mg. with the standard technique.

No harmful effects of the drug have been observed in over 300 cases tested, and in infective hepatitis moderate doses (300 mg. t.d.s.) seem to shorten the period of invalidity. As previously reported,[1] I tried excessive doses (1800 mg. daily for five days) on myself, and the only abnormal results were the signs and symptoms of mild sprue, complete with magenta tongue. These disappeared rapidly with massive doses of riboflavine. However, to avoid the possibility of artificial sprue, it is advisable to use the standard technique.

1. Erdei, A. *Brit. med. J.* 1947, i, 822.

N.T.T. IN DISEASES OF THE LIVER

Originally I used the test as a quick ward test to assess the severity and check the progress of infective hepatitis. In over 200 cases tested the N.T.T. has always shown high values, the tolerance being in proportion to the severity of the clinical symptoms. Laboratory liver-function tests could be performed in only a small proportion of the cases. A decreased galactose tolerance was always demonstrated whenever the N.T.T. value exceeded 400 mg., and positive Takata-Ara and thymol-turbidity reactions were obtained at N.T.T. values of 600 mg. and over. These findings were as follows:

Disease	*No. of cases*	N.T.T. (*mg.*)
"Normal controls"	48	50–150
Infective hepatitis, mild	152	400–600
,, ,, severe	53	700–900
Homologous serum jaundice	11	800–1200
Amœbic hepatitis, active	4	800–1000
,, ,, chronic	7	300–600
Infectious mononucleosis (abdominal and typhoid forms)	3	400–600
Chronic sprue	2	200 (loading dose)
Obstructive jaundice	5	200–600

Cases of infective hepatitis were classed as Mild or Severe according to the clinical picture, and later also according to the result of the N.T.T.

The N.T.T. value of 600 mg. was obtained only once in obstructive jaundice—in a case which had lasted 8 months. It was a case of painless obstruction of the common duct after antisyphilitic treatment. The long-standing back pressure in the bile flow caused some degree of secondary hepatocellular damage, as confirmed by biopsy at the operation. The history of this exceptional case will be published separately. In no other case of obstructive jaundice has the N.T.T. value exceeded 300 mg.

N.T.T. AND CYSTINE

There is considerable evidence that certain amino acids, mainly cystine and methionine, are necessary to

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the normal function and repair of the liver parenchyma, and I have considered the possibility that, in hepatitis, the body tissues may be raided for these essential compounds. I gave cystine 3 g. daily for five days to 2 patients with grossly increased N.T.T. figures. The results were as follows:

Disease	N.T.T. (*mg.*)	N.T.T. (*mg.*) *after cystine*
Homologous serum jaundice	1100	300
Severe infective hepatitis	800	200

In the first case the N.T.T. value two days after cystine had been discontinued increased to 900 mg.

N.T.T. IN VIRUS INFECTIONS

At this stage I happened to test a case of herpes zoster, and a tolerance figure of 1600 mg. was obtained, higher than in severe homologous serum jaundice. Another case of herpes zoster gave a N.T.T. value of 1400 mg., and a case of Bell's palsy of sudden onset, with involvement of the motor roots of the trigeminal and hypoglossal nerves, reacted only at 800 mg. These patients recovered completely within two weeks.

Some laboratory liver-function tests were made on one of the cases of herpes zoster: the van den Bergh reaction was negative; the excretion in the galactose-tolerance test was 2·65 g.; and the serum albumin : globulin ratio was 1·3 : 1. Three cases of infectious mononucleosis tested gave N.T.T. values of 400, 600, and 600 mg.

N.T.T. IN PULMONARY TUBERCULOSIS

The N.T.T. was performed on 13 cases of pulmonary tuberculosis. In these cases daily increasing doses of nicotinic acid were given, as already mentioned. The loading dose value (200 mg.) was obtained in one elderly patient only; he had a relatively inactive fibrous lesion. In the other 12 cases the N.T.T. values were 300–500 mg.; young patients with a relatively short history of the illness gave the highest values; wasted patients gave rather low ones.

I tried to correlate these findings with the patients' protein metabolism. There being no facilities for estimation of the nitrogen balance, in 6 male patients the 24-hour urinary output of creatinine was colorimetrically determined, giving the following results:

Case no.	*Type of patient and disease*	N.T.T. (*mg.*)*	*Creatinine (g.) in 24 hr.*†
1	Young; toxic	400	1·9
2	Elderly; active bilateral lesions	500	4·3
3	Empyema draining well, lung lesions quiescent	300	2·6
4	Young; toxic	300	3·5
5	Young; toxic, A.P. being established	300	2·5
6	Active disease, gross loss of weight	300	2·9

* N.T.T. values obtained by the method of daily increasing doses are lower than those obtained by the standard technique.

† The normal daily output of creatinine is 1–1·5 g.

DISCUSSION AND CONCLUSIONS

It seems to be established that N.T.T. always gives an increased figure in hepatocellular lesions, and that the tolerance is proportional to the severity of the lesion.

It is further probable that N.T.T. indicates the amount of waste products present from the breakdown of protein molecules, and the decreased tolerance after cystine (should this be confirmed in further tests) seems to indicate that the protein concerned is endogenous. Such an increased breakdown of body proteins certainly takes place in diseases of the liver parenchyma, but it has also been shown that the same process must be assumed in several illnesses not directly connected with liver functions—certain virus infections, and tuberculosis—as indicated by increased N.T.T. values.

The "normal controls" mentioned above include patients with different illnesses (bronchitis, pneumonia, septic throat, helminthiasis, &c.) with no increased N.T.T. values. It is probable, however, that increased N.T.T. values will be found in other medical conditions. Thomson [2] found evidence for increased loss of body protein in typhoid fever and malaria, and Stevenson et al.[3] refer to this breakdown process "in certain diseases."

This protein destruction in various illnesses is similar to the protein katabolic period after surgical trauma, described by Cuthbertson,[4] and further studied by Howard,[5] Stevenson et al.,[3] Beattie,[6] and others. These workers have, however, restricted the study of negative nitrogen balance to surgical conditions, such as fractures, burns, and operation trauma. They all agree that the nitrogen loss may be enormous if the patient is otherwise fit, and is reduced or even absent in wasted or starved patients.

Similar to the finding that the administration of cystine seems to reduce N.T.T. values is that of Croft and Peters,[7] who found that the nitrogen loss in burned animals could be eliminated with methionine. Peters [8] has reported improvement in severe cases of exfoliative dermatitis—truly a medical condition—treated with methionine, probably by reducing the protein breakdown.

It is justifiable to assume that the breakdown of body proteins in surgical and non-hepatic medical trauma is the same as that in hepatitis. In infective hepatitis one might argue that increased N.T.T. values are obtained because it is a virus infection, but the values are also increased in acute amœbic hepatitis; so this cannot be the true explanation.

Thus the question arises whether all these three phenomena are not identical; and, if so, which is the primary cause for the protein breakdown—damage to the liver parenchyma or the trauma? Does surgical or medical trauma cause hepatocellular damage by toxic by-products, and are the body-protein stores only then raided by the liver for its specific remedies, methionine and cystine? Or are proteins broken down in anticipation and for protection of the liver against possible injury?

Whatever the primary cause of the protein katabolism (liver damage or an attempt to prevent this), the reaction does not take place, and this protection is not given, in wasted and debilitated patients. It is possible that the administration of methionine and cystine may fill the gap, thus preventing the degeneration of the liver parenchyma so often observed at necropsy after a long illness. It is also possible that the therapeutic administration of nicotinic acid may provide the liver with an easy vehicle for removing the waste amino-acids. Some improvement in infective hepatitis on nicotinic acid has been observed. The nicotinic-acid tolerance test may be useful in further work on this subject by indicating the degree of protein breakdown.

My thanks are due to Dr. G. E. Beaumont for his encouragement and criticism throughout this work, and to Lieut.-Colonel G. Joly Dixon for his advice and encouragement. My release from the R.A.M.C. prevented me from completing the inquiry.

A. ERDEI
M.D. Vienna, M.R.C.P.

2. Thomson, A. M. *Practitioner*, 1948, **160**, 28.
3. Stevenson, J. A. F., Schenker, V., Browne, J. S. L. *J. Canad. med. Serv.* **2**, 345.
4. Cuthbertson, D. P. *Lancet*, 1942, i, 433.
5. Howard, J. E. *Arch. Surg., Chicago*, **50**, 166.
6. Beattie, J. *Brit. med. J.* 1947, ii, 813.
7. Croft, P. B., Peters, R. A. *Lancet*, 1945, i, 266.
8. Peters, B. A. *Ibid*, p. 264.

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Medical Societies

HUNTERIAN SOCIETY

Rheumatism in Hunter's Time

THIS society met at the Mansion House on Feb. 23, with Mr. A. E. ROCHE, the president, in the chair, to hear Dr. W. S. C. COPEMAN deliver the annual oration. He said that before the days of John Hunter the intimate relation between clinical observation, physiology, and pathology was not defined or codified.

Sydenham, partly as a result of painful personal experiences, separated gout from other forms of arthritis, recognising acute and chronic forms and exacerbations and remissions; he also described lumbago as a variety of rheumatism. But the terms "gout" and "rheumatism" continued to embrace a large and indefinite collection of syndromes throughout the eighteenth century. Sauvages in his great work *Nosologia Methodica* (1763) made the first real attempt at classification, and defined rheumatism as a generic term for many diseases affecting the bones and muscles and accompanied by pain and disability. William Cullen in his *Synopsis* dealt with rheumatism under the headings of "acute" and "chronic" and of "odontalgia" (toothache) which was considered to be arthrodynia of the socket and a form of rheumatism. The humoral theory of the origin of gout persisted well into the eighteenth century. Oliver, of Bath, in 1707 described it as a most stubborn distemper "baffling all the professors of physick that ever have appeared in the world," and said that the cause lay "too deep for any medicine or method yet known to come at the bottom of it." Cadogan (1771) put forward the disagreeable view that gouty persons suffered by their own fault, and that although this fact was sometimes recognised by enlightened doctors they were afraid to tell their patients so. This writer thought the causes might be very fairly reduced to these three—indolence, intemperance, and vexation.

No ætiological distinction between acute and chronic rheumatism was made in the eighteenth century. Dumoulin (1710) gave it as the opinion of the English school of physicians that the disease had become commoner and was due to fermentation of acid salts in the blood. Some of these eighteenth-century authors seemed to regard rheumatism as a diffuse type of floating gout, though Cullen thought of it as an inflammatory disorder of the blood-vessels caused by cold. Lumbago and sciatica were ascribed by Sydenham and his followers to rheumatism with a special localisation. The humoral theory waned in the middle of the century, and it came to be realised that each disease had a special anatomical end-result. This was crystallised in the publications of Morgagni, and improved upon by Matthew Baillie in his *Morbid Anatomy* (1793).

Malingering was apparently a feature in the wars of the eighteenth century; Sir John Pringle in his *Diseases of the Army* (1752) suggested that soldiers who reported sick for rheumatism, but who had nothing clinically to show for it, should be bled to see whether the "buffy coat" (due to quickened erythrocyte sedimentation) appeared: "If the blood is not found sizy we may presume the soldier either pretends indisposition or that the pains are of another nature." The first reference to occupational factors was Dr. Falconer's statement (1795) that "those who work in mines of coal or in other minerals and others employed where moisture is concerned are particularly liable to this disease."

In the eighteenth century the purpose of treatment for rheumatism or gout was to depress fever and to draw off "the acrid substances" by bleeding, purging, and blistering, and by a small diet and cooling medicines. Bleeding, carried out by the lancet or up to a dozen leeches, was the most controversial of the methods employed. Treatment flourished in the hands of quacks. Medicinal waters seemed to have been first described by Blackmore, who mentioned approvingly the spas of Hampstead and Islington. An early description of hydrotherapy was given by Cheshire (1735); and spas such as Bath and Buxton have records showing that they had long been favoured for the treatment of rheumatic disorders.

Reviews of Books

The Occasion Fleeting

HUGH BARBER, M.D., F.R.C.P. London: H. K. Lewis. 1947. Pp. 200. 15*s*.

NOT for the first time have the *Aphorisms* of Hippocrates been invoked as the text of such a book as this. Dr. Barber has followed up the evolution of the practice of medicine during the past generations, and his comments on this are often timely, apposite, and humorous. He gives us frankly a good deal of self-illumination, and though there may seem to be at times an overdose of quotation marks, his style is conversational, and as suitable for the lay reader as for his professional colleagues. The book contains many wise hints not only for the undergraduate and the family doctor but also for the consultant.

Retropubic Urinary Surgery

TERENCE MILLIN, M.A., M.CH. Dubl., F.R.C.S., F.R.C.S.I., surgeon, All Saints' Hospital for Genito-Urinary Diseases, London. Edinburgh: E. & S. Livingstone. 1947. Pp. 208. 25*s*.

IF Mr. Millin was not the first to discover retropubic prostatectomy, he certainly put it on the map; and now that he has further surveyed the territory he provides us with a more detailed plan, based on an experience of over 375 operations. His book is rather more than a description of the operation: it is a short monograph on prostatic obstruction, with its problems freshly approached. Operative technique is related directly to the anatomy, pathology, and clinical facts of disease of the prostate and bladder neck, which are well described and illustrated. His standard operation is explained clearly with the help of some good drawings by Miss Barbara Nicholson; and it is interesting to note the changes he has made in the technique since the first published account of the operation. The exposure of the adenoma has been simplified by using only diathermy and forcipressure to control the bleeding, and by omitting the separate dissection of the fascia and capsules. An important additional step is the resection of a wedge from the posterior segment of the bladder neck; this has almost eliminated postoperative obstruction. The operation may be adapted to several kinds of bladder-neck disease. For the calculous prostate he performs a subtotal prostatectomy without opening the false capsule and thus avoids the difficulty presented by the absence of planes of cleavage within the gland. For carcinoma of the prostate the operation is still further extended, the whole gland being removed together with a cuff of bladder—at least as radical an attack as the perineal approach provides. Other retropubic operations are described for postprostatectomy obstruction, traumatic rupture of the posterior urethra, and stress incontinence in women.

Mr. Millin is concise and easy to read, while his enthusiasm and disarming partiality make his presentation of the subject clear and forceful.

New Biology 3 (London: Penguin Books. 1947. Pp. 175. 1*s*.).—It is refreshing to find scientific essays which neither overwhelm the general reader with technicalities nor infuriate him with patronage. The Penguin series is excellent; and this issue, under the editorship of M. L. Johnson and Michael Abercrombie, deals among other things with locusts, roundworms, the electron microscope (beautiful photographs), and ship-fouling. All this and more for less than the price of a pint of beer is solid comfort in an inflated world.

A Handbook of Hygiene (2nd ed. London: E. Arnold. 1947. Pp. 368. 7*s*. 6*d*.).—Dr. C. G. Eastwood's useful little book deserved a new edition, for it is ten years since the last appeared. Some parts have been entirely rewritten; and the section on the physiology of reproduction has been expanded. The pictures are of prime importance, and the text explains and elaborates them. They are very good in the main, but one or two now have an old-fashioned look—notably the diagram of the human nervous system in relation to the body, and the dark scene of children being tested by means of the audiometer. A few others have not reproduced well on contemporary paper.

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THE LANCET

LONDON: SATURDAY, MARCH 6, 1948

Folic Acid and the Nervous System

ONE of the surprises of treatment with folic acid has been the complete failure of this anti-anæmic substance to influence the changes in the nervous system (both peripheral and central) that occur in many patients with pernicious anæmia.[1] It can be argued, with ARTHUR HURST, that the changes in the hæmopoietic system and in the nervous system are due to deficiencies of different factors, both somehow connected with the achlorhydria that is always found; and in support it can be noted that there are patients with pernicious anæmia who have no detectable involvement of the central nervous system, and patients with combined tract degeneration in the spinal cord who have no anæmia. Even so, it is hard to explain why signs of damage to the posterior and lateral spinal cord tracts should appear—sometimes with acute onset—in those whose blood has been restored to normal and is being kept normal by giving folic acid. This acute cord involvement is something new—something not previously noticed in the natural history of the disease complex we know as pernicious anæmia. Furthermore, when proper treatment with liver is substituted for the folic acid, recovery of the nervous system is much quicker than is usual in the naturally occurring combination of pernicious anæmia and posterolateral tract sclerosis. Some workers have indeed begun to suspect that folic acid, for all its hæmopoietic benefits, may interfere in some way with the metabolism or function of the conducting tissue of the nervous system.

In the U.S.A., Ross and colleagues[2] describe 22 cases of pernicious anæmia treated with folic acid. In 7 of them this acute posterolateral dysfunction appeared during treatment; in 4 others pre-existing signs of nervous disturbance became worse, and in another case such signs did not improve. Of 5 acutely affected patients who were given liver extract in addition to folic acid, the signs progressed in 4 and in the other they did not disappear until folic acid was discontinued: when liver extract alone was given, they all recovered. Elsewhere in this issue Professor DAVIDSON and Dr. GIRDWOOD similarly report 2 cases of pernicious anæmia in which signs of posterolateral tract affection appeared during treatment with folic acid but disappeared when folic acid was replaced by liver. They also, moreover, report 2 cases in which signs of severe peripheral neuritis, with muscular wasting and sensory disturbances, appeared in patients who were being given folic acid for steatorrhœa. One of these patients did not improve on receiving thiamine as well as folic acid, but in both of them the peripheral neuritis regressed when intramuscular liver extract was given and folic acid was stopped. Yet another patient, after taking folic acid for relapse of sprue contracted in India, developed a combination of dermatitis, sore tongue, and mental depression, reminiscent of pellagra. This condition did not respond to nicotinic acid; it was relieved by folic acid and intramuscular liver given together, or by liver alone; and when the liver was stopped the dermatitis recurred.

For this curious action of folic acid different explanations are suggested. Ross and his colleagues observed that on the whole the patients who showed signs of posterolateral tract disturbance were those receiving the larger doses, and they were impressed by the fact that the disturbance persisted as long as folic acid was taken. They note that folic acid has a terminal *l*(+) glutamic acid group and they link this with the special part played by *l*(+) glutamic acid in the metabolism of the nervous system. Is it possible, they ask, that folic acid denies to nervous tissue an essential substance, in much the same way as the sulphonamides block the utilisation of *p*-aminobenzoic acid in bacterial metabolism? DAVIDSON and GIRDWOOD, on the other hand, are impressed by the relation of folic acid to the other members of the vitamin-B complex. They recall that treatment with one member of this complex sometimes brings out signs of deficiency of others. The appearance of peripheral neuritis and of pellagrous symptoms in their steatorrhœa patients made them think that such a disproportion of vitamin-B members might be responsible, and that a similar mechanism might explain damage to the posterolateral tract during treatment of pernicious anæmia with folic acid. Liver extract may exert its beneficial effect, they believe, by "liberating" the appropriate vitamins from "conjugated" forms. As yet, however, neither of these explanations is more than a suggestion to be tested by investigations which the two sets of workers have in view. At the moment, perhaps, Ross's hypothesis seems the more likely. Whereas the American cases are uncomplicated, the Edinburgh cases of steatorrhœa have complex histories and possibly multiple deficiencies. Although much effort has been expended in the past to link subacute combined degeneration of the spinal cord with vitamin-B deficiency, the connexion is not generally regarded as important. And we have to reckon with the fact that SPIES'S[3] patients with nutritional anæmia, who were kept on a deficient diet and treated with folic acid, did not develop signs of other vitamin-B deficiencies.

This work may well advance our knowledge of the causes of these neurological lesions. Meanwhile, for the doctor treating patients, the practical lesson is clear and agreed: folic acid, whether alone or with liver extract, must not be given to patients with pernicious anæmia who show any sign of involvement of the nervous system. The idea that a mixture of

1. *Lancet*, 1947, i, 182; Wagley, P. F. *New Engl. J. Med.* 1948, 238, 11.
2. Ross, J. F., Belding, H., Paegel, B. L. *Blood*, 1948, 3, 68.
3. Spies, T. D. Experiences with Folic Acid. Chicago, 1947; Spies, T. D., et al. *Lancet*, Feb. 14, p. 239.

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folic acid and liver extract is preferable to liver alone is decisively negatived. The correct treatment for pernicious anæmia is to give liver extract by intramuscular injection or a potent desiccated stomach preparation by mouth.

Studies of the Frontal Lobes

THE many attempts in the past to locate mental functions in specified parts of the brain have mostly been too crude for acceptance and absurd enough in retrospect to make psychologists and psychiatrists chary of further speculation of this kind. The derisive catchword "brain mythology" has also acted as a deterrent. Consequently, when MONIZ put forward his operation of leucotomy with a suggestion that by cutting association fibres the surgeon might deprive delusional ideas of a necessary condition for their existence, he was not creating for the treatment a favourable climate of opinion. But nowhere is the therapist more adventurous, empirical, and sanguine than in psychiatry; and the operation established itself without suffering any serious detriment from its speculative initial assumptions. Having established itself, it seems to be heaping coals of fire on the heads of those strict thinkers who looked harshly on its beginnings; for it has afforded valuable evidence about the anatomy of the brain and has stimulated profitable thought about the connexions between brain structure and mental functions. Prof. LE GROS CLARK's paper (p. 353) bears witness to the former and Dr. RITCHIE RUSSELL's (p. 356) to the latter.

The researches of ALFRED MEYER and his colleagues at the Maudsley Hospital amplified our knowledge of the connexions of the frontal lobe in man, because the new method of treating mental disease incidentally provided the material of a human experiment on lines already familiar in laboratory experiments on animals. When set alongside the recent American studies of METTLER, MCCULLOCH and his associates, and GELLHORN, and the somewhat earlier findings of LE GROS CLARK, they give a much clearer understanding than was previously possible of the rôle of the frontal lobes and the important pathways which connect them with other regions of the cerebral cortex and with the hypothalamus. RITCHIE RUSSELL goes boldly forward in propounding his views on the location of psychological functions. He would seat memory and the basic pattern of adult intelligence near the posterior part of the boundary between the parietal and temporal lobes on the dominant side, whereas the prefrontal lobes are held responsible for determining or moulding these basic patterns during maturation, and for mediating emotional drive in adult life. He contends that leucotomy relieves anxiety by interfering with the complicated mechanism of cortical activity which, in the presence of conflict, would otherwise reach an intensity sufficient to arouse anxiety.

So far prefrontal leucotomy has thrown more light on cerebral anatomy than on cerebral physiology, psychology, or psychopathology. The reasons for this are only partly inherent in the technical and theoretical problems to be solved. The experiment on human beings which this surgical treatment incidentally provides could be turned to fuller advantage if before operation, at operation, and afterwards the need for minute and systematic examination was invariably borne in mind, so that the physiological and psychological effects of dividing defined anatomical structures were studied with the scrupulous exactitude applied to experiments in the laboratory. The difficulties in the way of such thoroughness need not be minimised; but unless they are overcome the full fruits of this therapeutic advance will not be gathered. Routine clinical examination by the customary psychiatric and psychological methods is useful in determining roughly the indications and benefits of the operation, but much more than that should be made of such an opportunity. The anatomical studies have shown the way.

Radio-isotopes for Local Treatment of Tumours

THE therapeutic potentialities of the radioactive isotopes are being vigorously explored in the United States. Attempts are being made to obtain selective irradiation of the lymphatic and reticulo-endothelial systems by using colloidal solutions of radioactive isotopes of metals that are deposited in these cells. Isotopes that are chiefly beta-ray emitters are chosen for this purpose because such rays penetrate only about a millimetre and so have little effect on surrounding tissues. Solutions of radioactive manganese were tried first, but there were difficulties and disadvantages with this material.[1] HAHN, SHEPPARD, and their co-workers[2] now report better results with radioactive gold salts. The isotope selected is Au^{198}. This has a half-life of only 2·73 days, and a short life makes it possible to assess results more rapidly and to control treatment more easily. Au^{198} is a beta-ray emitter but also gives off a weak gamma ray; this gamma radiation is not strong enough to have any significant effects on tissue but is extremely useful in enabling the presence of the isotope to be readily traced and its intensity estimated. Finally this gold isotope has no troublesome contaminants and does not give rise on decay to any longer-lived isotopes that might be dangerous. The radioactive gold is made into a stable colloidal solution that can safely be autoclaved. Given intravenously to patients with lymphatic leukæmia it has produced some remission in the same way as other suitable isotopes. A new use for this material is in the local infiltration of tumour masses to provide a localised radiation. Experience has shown that, provided the tumour is not too vascular or friable, the radioactive gold particles are retained in the tissues and thus provide a localised radiation without disturbing surrounding tissues. The colloidal gold solution is injected into the mass through a long fine needle, as in local anæsthetic infiltration.

The types of case treated successfully are as follows:

A patient with Hodgkin's disease had received various forms of treatment, including intravenous nitrogen mustard, radioactive manganese, and colloidal gold, but two enlarged cervical lymph-nodes had proved resistant. They were therefore infiltrated, one with 1·5 ml. and one with 0·3 ml. of radioactive colloidal gold solution. Redness, swelling, and tenderness developed

1. Hahn, P. F., Sheppard, C. W. *Sth. med. J.* 1946, **39**, 558, 562.
2. Sheppard, C. W., Goodell, J. P. B., Hahn, P. F. *J. Lab. clin. Med.* 1947, **32**, 1437; Hahn, P. F., Goodell, J. P. B., Sheppard, C. W., Cannon, R. O., Francis, H. C. *Ibid*, p. 1442.

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and lasted for about twelve hours. Four months later the nodes had disappeared.

A man had a fibrosarcomatous mass below the left clavicle measuring 14×12 cm. and rising 3·5 cm. above the surface. It was infiltrated with radioactive gold solution, and apart from a feeling of constriction the patient had no discomfort. Measurements with Geiger counters showed that most of the injected dose had been retained in the tissue. Three further infiltrations were made at intervals, and after six weeks the mass had completely disappeared.

A man with chronic lymphatic leukæmia had enlargement of the liver, spleen, and many lymph-nodes; he also had numerous raised subcutaneous lesions, largest on the forehead. Treatment over a year with colloidal radioactive manganese produced a normal white-cell count and reduced all the lesions except the subcutaneous ones. Infiltration with colloidal radioactive gold caused the lesions to flatten, and only a discoloration remained after two weeks. Some more of these lesions were treated by fixing over them a gauze dressing soaked in the colloidal gold solution and leaving it in place for three days. After an inflammatory reaction lasting two weeks the treated areas crusted and finally desquamated, leaving an area of apparently normal skin.

A man had a squamous-cell carcinoma which had recurred after many exposures to X rays and now filled the left nostril and extended into the internal angle of the left orbit. The whole mass in the nostril and overlying the nose was infiltrated with the colloidal gold solution and it shrank considerably. The patient felt only a temporary burning sensation.

Such are examples of the good results. Failures could be traced to the radioactive gold not being retained in the tissue. Several attempts were made to infiltrate tumours of the female genital tract, but seepage from the tumours was gross, and insufficient radioactive material was left in the tissues. A metastatic malignant lesion in the scalp was infiltrated, but hardly any radioactivity was retained; later the tumour was found to have large wide blood-vessels by which presumably the radioactive particles were rapidly removed. To try to overcome this difficulty HAHN is now experimenting with a radioactive silver nitrate solution containing the isotope Ag^{111}, with the idea that the cauterising action of the silver salt will aid its retention. Ag^{111} is a pure beta-emitter and there are therefore difficulties in detecting its presence by external measuring apparatus. Ag^{108} and Ag^{110}, which have some gamma radiation, are too long-lived for safety.

It is only fair to note that these results are still preliminary. We do not yet know anything about recurrences or the long-term prognosis. The radioactive materials have to be handled with great care; all operations, such as preparation of the colloidal solutions, have to be carried out behind lead screens. The short half-life of the suitable isotopes means that treatment centres must obtain the active material within a few hours at most of its manufacture; so such treatment is at present limited to the U.S.A. The cost, however, is not excessive: $2 to $5 per dose. A practical technique for treating accessible but deep malignant tumours by direct infiltration, instead of by X rays through layers of normal tissue or by the implantation of radon seeds, would enable a fresh attack to be made on this difficult group; and infiltration does not carry the dangers that are now suspected to accompany intravenous injection of radioactive isotopes. We can be sure that further experiment will overcome the present technical difficulties.

Transforming the Hospital

THIS week we conclude our short series of articles on hospitals in other lands. Much can be learnt from recent experience outside this country, for during the inter-war years Britain denied herself the extensive construction undertaken elsewhere in Europe and in North America. Our hospitals are now both insufficient and largely outdated, and it will be long before their deficiencies can be made good. In some ways, however, this further delay will be an advantage. By ending the dual organisation, the National Health Service paves the way for a rational plan by which each hospital can be designed to link with its neighbours in the regional network; and to this end experiment with the division of personnel and functions should perhaps precede actual construction. In any case opinion on the form and functions of the hospital is changing rapidly, and a design which would have been readily adopted fifteen or even ten years ago would no longer be acceptable today. This change is seen most clearly in the insistence that special and general hospitals should be brought together. Addressing the Royal Society of Medicine last Monday, Sir ERNEST ROCK CARLING suggested that separation can be justified only for reasons of teaching or research; normally the special hospital should return to the domain of the general hospital, and in particular tuberculosis and other infectious diseases should be reintegrated with the main body of hospital practice. But, even if they would, most general hospitals are in no position to take back into the fold these special departments until they move to new and larger sites. Voluntary hospitals in the towns, on small sites, have had ad-hoc extensions from time to time; nearly all need rebuilding on a site between two and ten times as large as at present; and the only way this can be done, Sir ERNEST said, is by moving to the edge of the towns.

The hospital surveys showed that some 100,000 more hospital beds are needed. Yet, owing to the dearth of nursing and other ancillary staff, even the existing number cannot be operated to the full; and, though aggravated by the war, this shortage is more than a passing embarrassment. How, then, is the necessary expansion to be achieved? Dr. C. T. MAITLAND's argument,[1] reiterated at this week's meeting, is that there should be fewer beds and better treatment. The hospital, he believes, should be principally a treatment centre and only secondarily a place of residence. The pressure on beds could be eased by having special departments for patients undergoing investigation and by a rapid tempo in the diagnostic departments, while further relief may be gained by establishing hostels for convalescents and for certain categories of patients under treatment —such as diabetics and those receiving radiotherapy. Wise as these suggestions are, however, they do not remove the need for recruiting more nurses and other hospital workers; and here success will depend, in the words of a delegation from Charing Cross Hospital which recently toured the Continent, on the amenities and conditions meeting "the needs, the human desires, and the social aspirations of the staff."[2]

1. See *Lancet*, 1947, ii, 726.
2. Travel Reports, no. 1: Visit of Charing Cross Delegation to European Hospitals. King Edward's Hospital Fund for London. 1948. 1s.

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This has first to be acknowledged at the planning stage—for example, by the provision, outside the hospital grounds, of nurses' rooms or flats (as in Scandinavia), by the inclusion of bathrooms for kitchen personnel, and by providing space for a nursery where day staff may leave their children. Moreover, nothing capable of lightening the labours of the staff should be neglected. Quick and efficient lifts, power-driven food trolleys, mechanical floor-polishers—these and other devices, though initially expensive, are ultimately economical. In this light the compactness achieved by JEAN WALTER [3] at Lille and elsewhere glows with special virtue; and his practice of obtaining a job analysis of routine tasks before deciding on a plan might well be imitated here. No hospital can afford to overlook features which will make the life of its staff, and particularly its nursing staff, more pleasurable or easy; and these features should be given prominence in the otherwise less attractive institutions, which may hope in this way to draw level in the race for personnel.

The capacity to attract and retain staff is pivotal to the ultimate success of the hospital programme. In the meantime, interest centres round the study of hospital functions and the training, organisation, and dispersal of staff. Many authorities now urge the allocation to hospitals of new and wider functions. Sir ERNEST ROCK CARLING holds that they should come to be associated with the preventive services; such association, he reasons, would enlarge the vision of physicians and surgeons. He would like, too, to see a place made in the hospital for general practitioners—a view shared by Sir WELDON DALRYMPLE-CHAMPNEYS. "The general practitioner," said the latter, "should have the position he deserves as the man at the helm"; for it is he who best knows the circumstances and is in closest sympathy with the patient, and he is "the one man who can protect his patient against mishandling by the specialist." Two trends are thus recognisable: one towards breaking down the artificial barriers which now separate those in different fields of hospital practice, and the other towards bringing together those who are employed within and those who work outside the hospital. Too often the hospital is an ivory tower; but if these two trends continue it could become a meeting-place for all, and help to restore the unity of medicine.

3. Walter, J. *Lancet*, Jan. 3, p. 36.

"... While the progress of a hospital toward efficiency may be accelerated or retarded by its status as a public or a private institution, social, scientific, and economic forces play upon all types of hospitals without regard to their official relations. Perhaps the greatest single factor in modern hospital development has been the specialization of labor, a process which may be observed both in the medical branches and in general hospital administration. The intensive cultivation of limited areas of thought and action is a phenomenon characteristic of our age. It has left its impress on all the sciences and on most of the arts, but in medicine its first strong impulse has now been expended, and the period of differentiation, which tended to separate medical practitioners into many classes, has been followed by an irresistible demand for the co-ordination of the efforts of the different types of practitioners. . . . The time is approaching when the specialist will not be willing to treat most of his patients unaided, and when public opinion will decline to sanction such treatment, even if the specialist be willing."—The late Dr. S. S. GOLDWATER, *On Hospitals*. New York and London, 1947; p. 7.

Annotations

THE TEACHER'S INCOME

ANYONE reviewing the remuneration of doctors must be struck by the smallness of the incomes earned by most of those holding full-time academic appointments. At a time when an effort is being made to introduce national scales of payment this anomaly needs reconsideration, and we are glad to know that at least one important professional body has pointed out that the salaries of clinical university professors ought to be in keeping with those of other specialists in the National Health Service. At present such salaries generally range from £1500 to £2500 a year, with superannuation and sometimes family allowances; and in the new service this is the kind of income which will be earned by all but the younger and less successful general practitioner. The position is summarised as follows by the distinguished holder of one of the less remunerative chairs:

> If we continue to be paid at the same rate as an average general practitioner, while the scope of professorial responsibility steadily widens, the supply of professors will eventually cease. We simply cannot go on trying to treat, teach, investigate, read, bring on our young men, reorganise clinical teaching, and help to direct regional hospital affairs, while devoting our leisure to drying dishes and laying fires.

This particular professor has the right to supplement his salary by private practice, but with so many other responsibilities to fulfil he can make little use of it. And the financial situation of his juniors—the senior lecturers—with salaries often below £1000, is still less attractive. Asking how this situation will be affected by the National Health Service, a lecturer in surgery tells us that many of his colleagues—notably those teaching preclinical subjects—wonder why their remuneration should be "so very much lower than that of the general practitioners and embryo specialists whose education is in our hands."

The difficulty is an old one. On the one hand, it is unreasonable that a professor of medicine—perhaps one of the leaders of the profession—should earn far less than fellow physicians who hold no academic appointment. On the other hand, how can a university, as such, say that those of its professors who happen to be doctors shall thereby be entitled to salaries twice as high as those that go with the chairs of chemistry and Greek? The coming of the National Health Service will do something to solve the problem for teachers who are able to accept part-time appointments and are paid for these appointments at the same rates as other specialists, but some special arrangement will be necessary if it is to help professors and lecturers who are employed full-time by their university and are therefore not in a position to hold a part-time post too. We can only suggest that in such circumstances the hospital for which they work should arrange with the university to supplement their salaries in consideration of their service to patients in the hospital. In looking after patients they undertake a responsibility additional to that of teaching, and there is every reason why this should be recognised appropriately.

Indeed, there seems to be a strong case for special remuneration wherever some special responsibility is borne by a teacher. It may well be reasonable that all university chairs should carry the same salary; but there should be a substantial supplement wherever the teacher is additionally responsible, or partly responsible, for the work of any kind of institute laboratory. Further, in so far as the teacher, as clinician or pathologist, assumes responsibility in matters of life or death, he is entitled to remuneration at least as high as that of colleagues outside academic life who have similar cares.

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NEWCASTLE DISEASE

An article by Mr. Francis which we publish this week shows the progress which is being made in active immunisation against the commoner virus diseases of animals. One of those he considers is Newcastle disease of fowls, which has lately been giving much trouble in this country. It is thought that the infection may have arisen as a "new disease" in the Far East about 1926, and its virus origin was established in 1927 by Doyle [1] at Newcastle-on-Tyne. Classically it is characterised by evil-smelling yellow diarrhœa; in about 70% of birds there are respiratory symptoms, and some show nervous derangement. Burnet made the interesting suggestion that it belongs to the influenza group; and he reports that the virus has caused infection in a laboratory worker.[2] The condition known in the United States as avian pneumoencephalitis is now recognised as an atypical form of the same disorder. After an absence of fourteen years Newcastle disease reappeared in Great Britain in February of last year, and before the end of April over 70 outbreaks were diagnosed in 23 counties. Birds in affected flocks have been destroyed under the Fowl Pest Order with the object of again eradicating the disease, but there were 112 outbreaks of fowl pest in July, 62 in August, and 146 in September. The numbers of birds slaughtered in those months were approximately 19,600, 5300, and 13,000 respectively.[3] Up to November, the Minister of Agriculture stated,[4] about 173,000 poultry, worth £185,000, had died or been killed because of the pest, and Mr. W. R. Wooldridge,[5] scientific director for the Veterinary Education Trust, estimated the consequent loss of eggs during 1948 at 15 million. Standstill orders have been applied over large areas.

Though Newcastle disease spread widely in Europe during the war, large numbers of dead poultry have been imported into Britain. It would seem that, just as in the 19th century when rinderpest and other diseases were imported from Europe, British stockmen and consumers have paid a heavy price for the privilege of eating foreign flesh from infected areas. If the choice was open to us, it would have been much better to import feeding-stuffs for building up our own poultry flocks.

THE BASIC COURSE AGAIN

In commenting on the report of the Working Party on the recruitment and training of nurses, the British Hospitals Association have taken the opportunity of putting proposals of their own for a constructive short-term policy. These include a system of training on the lines advocated in our columns for some time past. The aim of training, the association believe, should be to produce "a first-class practical bedside nurse." They think she should begin with a preliminary training course lasting 16 weeks if taken in the hospital preliminary training school (P.T.S.); but they suggest that it might preferably be taken at school or in night classes, where it could be spread over a longer period: schoolgirls over 16 would thus be able to combine it with their general school education. Those who had taken this "pre-clinical" course before entering hospital would only spend 3–4 weeks in the P.T.S., while those who had not had the opportunity would be able to take the whole course in 16 weeks. The association share our belief that all entrants to the nursing profession should have "equality of opportunity." The basic nursing course would consist of two years' training (inclusive of the preclinical course), predominantly practical in nature, and common to all entrants. The examination at the end of this course would be essentially practical, and the qualification—which should *not* be for the State register—would carry the designation of "nurse," and the right to practise under certain safeguards. A third year should be spent partly in practical nursing in hospital and advanced theoretical study, and partly in "elective" training. The aim would be to broaden the nurse's general hospital experience and to improve her arts and skills, while giving her the chance to take more responsibility, and to begin to gain special knowledge in some branch that appealed to her. Actual specialisation, however, should be postponed, the association say, until she holds her State certificate, when she could work for a diploma in her chosen field.

They do not think the student nurse should be moved too freely round the hospital, or group of hospitals, in which she is studying. The aim must not be to give her experience in every specialty but to train her well in medical and surgical nursing, including gynæcology. But for some reason they hold that student status would give her "many grave misconceptions as to the nature of her professional life and her responsibilities as a practising nurse." It is difficult to see why this should be so: the effects of their status on other types of student are not so malign.

Some additional proposals on the organisation of training and the administration of nursing deserve study. The association emphasise the value of good staff relationships, and maintain that appointments must therefore remain the prerogative of the hospital management committees. They oppose undue centralisation and administrative control. Too many bodies, unlike many hands, do not make light work. They feel that if we are to have latitude for initiative and experiment in nursing training there must be as much decentralisation as possible.

BLOOD-GROUPS AND TOXÆMIA OF PREGNANCY

Forty years ago Dienst suggested that toxæmia of pregnancy is due to immunisation of the mother by antigens passing through the placenta. Lately this view has been revived by Edlén and colleagues [1] in Sweden. They claim that nearly all cases of toxæmia, especially in primiparæ, are due to ABO-heterospecific pregnancy, the heterospecificity being defined by the blood-group of the father, not that of the child. It is claimed that when the father belonged to group O or the mother to group AB, or when the mother and the father were of the same group, there were no cases of toxæmia, whereas in cases of heterospecificity there were 7 instances of toxæmia in 10 first pregnancies, and 4 in 22 later pregnancies. The results of attempts to desensitise mothers early in pregnancy by intracutaneous injections of the fathers' serum are to be published later.

If these findings can be confirmed they will obviously be important, but unfortunately the balance of evidence does not seem to support the claims. In only 3 of the cases of so-called "heterospecific toxæmia" are the infants' blood-groups given in the tables; and in these examples the group-O mothers had group-O children, though the fathers' blood belonged to group A. It is difficult to see how a group-O child can sensitise a group-O mother, even if the father has an A agglutinogen in his cells. Boorman et al.[2] and Smith [3] have shown that the titres of A and B antibodies are indeed raised in pregnancy when the children are A or B secretors, but Hurst and colleagues [4] found a negligible excess of heterospecificity in cases of toxæmia, and Boorman et al.[5] likewise found no correlation, both groups of

1. Doyle, T. M. *J. comp. Path.* 1927, **40**, 144.
2. Burnet, F. M. *Med. J. Aust.* 1943, **ii**, 313.
3. *Vet. Rec.* 1947, **59**, 614.
4. *Hansard*, Dec. 8, 1947, par. 128.
5. *Evening Standard*, Dec. 17, 1947.

1. Edlen, A., Knutsson, B., Palmstierna, K. *Nord. Med.* 1947, **36**, 2281.
2. Boorman, K. E., Dodd, B. E., Mollison, P. L. *J. Path. Bact.* 1945, **57**, 157.
3. Smith, G. H. *Ibid*, p. 113.
4. Hurst, J. G., Taylor, H. C., Wiener, A. S. *Blood*, 1946, **1**, 234.
5. Boorman, K. E., Dalley, D., Dodd, B. E. *J. Obstet. Gynæc.* 1947, **54**, 281.

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workers having analysed much more extensive series of cases than Edlén et al. The Swedish report does not give the Rh groups of the patients; but neither the American nor the English workers found any association between Rh groups and toxæmia.

The findings of Edlén and colleagues are based on a very small series of cases (129 in all) over a period of six weeks, and the most probable explanation seems to be that they arose by chance. A nice simple explanation of the ætiology of toxæmia of pregnancy would be very welcome, but the mass of evidence is against this being the answer.

THE PSYCHIATRIST IN THE CHILDREN'S HOSPITAL

PÆDIATRICIANS and psychiatrists were brought together on Feb. 20 by the Royal Medico-Psychological Association to discuss the advantages of appointing psychiatrists to the staffs of children's hospitals. Prof. Richard Ellis said that, to serve the hospital well, the psychiatrist must be a full member of the staff, and liable, like his colleagues, to be asked to decide on hundreds of hospital questions. He could not sit in his ivory tower, fitted up with sand and water: he must come out into the neo-Gothic corridor and discuss common problems with his fellows. Nor must he set up a language barrier. Between pædiatrician and psychiatrist there is little, at present, of that charming playfulness to be seen among animals of the same species when no cause for suspicion exists; and if the psychiatrist thinks of the pædiatrician as sold to the microscope and the test-tube, the pædiatrician regards the psychiatrist as a trick-cyclist—a man whose feet are never on the ground. The estrangement is partly due to the fact that it is difficult for an appointments committee to pick a good psychiatrist on sight; for qualifications vary widely and are not generally understood. An advisory body of psychiatrists to advise on appointments would be of great help to such committees. The children's hospital should give the medical student and the house-man an opportunity to gain an understanding of the principles of child guidance—or at least to learn the composition of the clinic team, to see the children in outpatients, and to read the clinic reports. At present, reference of children to the child-guidance clinic is hampered by the geographical separation of the clinic from the hospital. Yet, as Dr. Mildred Creak pointed out later, the children attending a guidance centre in a hospital will inevitably be selected: the social delinquent and the child presenting an educational problem simply will not come that way. Nevertheless, with centre and hospital both housed in the same buildings there should be opportunities, Professor Ellis noted, for combined research and investigation; and he painted an encouraging picture of the pædiatrician, the psychiatrist, and the dentist sitting down to a round-table conference on thumb-sucking. After ten years of planned experiment they would be able to say whether the physical effects, if any, of this habit are more important than the emotional effects, if any, and whether treatment, if any, has any effect.

Dr. Mildred Creak agreed that it would be of great value to the psychiatrist to work in hospital among colleagues, and to share in responsibility to the hospital; but she pointed out that child guidance must by its nature be private and confidential. The child must feel relaxed and at ease, and he cannot reach this state before an audience. He must also be at liberty to make a mess. A child-guidance clinic inside a hospital thus makes great demands: it needs to be away from the bustle and noise of the ordinary outpatient department; many rooms must be set aside for it (rooms which after a session may need as much clearing-up as an operating-theatre); replacements must be catered for, noise and destructiveness accepted, and records more confidentially treated than is usual in other departments. Small wonder if psychiatrists get a queer reputation: they are private and secretive; "they don't work, they play." Moreover, they cannot teach by the ordinary methods of apprenticeship. Much teaching must be done at second-hand, at the seminar and case conference. In America teaching is managed almost entirely by concealed observation, but Dr. Creak felt that this practice would not be acceptable here. Dr. W. G. Masefield, the chairman, suggested that dictaphone records of treatment sessions might contribute to teaching; and Professor Ellis mentioned the possibilities of films.

Dr. Margaret Lowenfeld remarked that children have a different notion of privacy from adults. Thus 15 or 20 children can be given treatment in the same room, she finds, provided nobody else is present except the adults giving the treatment; and this makes it possible to include small numbers of students. Dr. D. W. Winnicott spoke regretfully of the length of the training needed by child analysts: "by the time they have done the D.P.M. and become analysts of adults, and then analysts of children, they are almost too old to practise." Nevertheless this lengthy training is necessary, he feels, and a suggestion made later that experience of general practice is also valuable for the child psychiatrist was supported by Professor Ellis. School-teachers, nurses, and pædiatricians were all proposed as suitable candidates for some psychiatric training. The first duty of a psychiatrist, Dr. Jean Biggar held, should be to ensure that the child's stay in hospital is not traumatic; and Dr. Mary Capes contrasted the enlightened practice, in New Zealand, of admitting mother and child together to a bed-sitting room in hospital, with the practice in an English hospital where visiting by parents is forbidden throughout the child's stay, and the pædiatrician in mask and gown stalks the wards like a bogy. All favoured study of the normal child—by marriage and parenthood if necessary.

B.M.A. AND NATIONAL HEALTH SERVICE

A SPECIAL representative meeting of the British Medical Association will open in London on March 17. The council has drafted the following resolution for consideration by the meeting:

(*a*) That the representative body, reaffirming the whole-hearted desire of the medical profession for a comprehensive health service available to everyone, urges that in the public interest such changes should be made in the Acts of 1946 and 1947 as are necessary to maintain the integrity of medicine and to prevent doctors being turned into State servants, with harmful consequences to patient and doctor alike. The representative body therefore expresses the hope that the Government will make it possible for the profession to coöperate by making such changes and states its view that it is not in the best interests of the public or of medicine for members of the profession to enter the service until such changes are made.

(*b*) That an Independence Fund be established to help to finance the profession's activities during the present dispute with the Government.

(*c*) That medical members of regional hospital boards and local executive councils be requested to continue their membership of these bodies for the present.

Air Vice-Marshal P. C. LIVINGSTON has been appointed director-general of R.A.F. medical services in succession to Air Marshal Sir Andrew Grant.

Dr. J. C. W. METHVEN has been appointed deputy chairman of the Prison Commission.

THE INDEX and title-page to Vol. II, 1947, which was completed with THE LANCET of Dec. 27, is published with our present issue. A copy will be sent gratis to subscribers on receipt of a postcard addressed to the Manager of THE LANCET, 7, Adam Street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive indexes regularly as published should do so now.

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Special Articles

IMMUNISATION AGAINST SOME VIRUS DISEASES OF ANIMALS

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IMMUNOLOGICAL methods play a large part in the control of several virus diseases of outstanding importance in veterinary medicine, and the investigations of the past few years have revealed a number of facts of interest to all workers on immunity to viruses.

RINDERPEST

The methods used to control rinderpest, which is the most serious virus disease of animals, have been reviewed by Francis (1946). Bile of affected animals, which contains partly inactivated virus, was originally used by the Boer farmers, but Koch found this means of immunisation unsafe. A serum-simultaneous method was next widely adopted, and it produces a solid immunity; but the production of serum of uniformly high quality is difficult and expensive, particularly under tropical conditions. As early as 1916 infected spleen pulp was inactivated in the presence of glycerol and used as a vaccine in Japan.

During the early 1930's tissue suspensions inactivated in the presence of eucalyptus or formalin were used fairly extensively; but again they were rather expensive to prepare, and afford immunity for only 9–12 months, which is less than the normal life of the bovine. It is an interesting fact that though the blood contains a high titre of virus it is useless for the production of vaccines. If an attempt is made to reinforce the immunity (produced by inactivated vaccines) by the injection of attenuated goat virus the results are irregular: some animals may react strongly to the attenuated virus, whereas in others the virus does not multiply at all and a permanent immunity is not produced.

In many regions by far the most effective method of controlling rinderpest is the inoculation of the goat-attenuated strain developed by Edwards (1927). It can be used safely in the relatively resistant cattle of India; but in some other parts of the world, where the cattle are more susceptible, the reaction has to be controlled with a smaller amount of immune serum than in the old serum-simultaneous method when unattenuated rinderpest virus was used. This work has been of immense value to the Indian cultivator, whose working and milking cattle have been so often decimated by rinderpest.

During the war a special team of U.S. and Canadian research-workers was organised to combat any possible introduction of rinderpest into North America. They confirmed the earlier work on the protective value of serum and the immunising properties of dead vaccines, but their outstanding contribution was the adaptation of the rinderpest virus to the chick embryo, which led to the development of a chick-embryo-adapted strain of virus, which appears to be more attenuated than the goat-adapted strain and may be of special value for immunising the more susceptible cattle, particularly in Africa.

SWINE FEVER

Attempts to produce immunity against swine fever were reviewed by Francis (1941). Dorset evolved the serum-simultaneous method of vaccination which, when applied under ideal conditions, will produce a strong immunity, but its use on unthrifty pigs may stimulate various latent infections and so cause serious losses. The use of live virus is an obvious danger, and the method has been prohibited in this country. Dorset recognised these disadvantages, and about the year 1930 began experiments with dead vaccines. Meanwhile workers familiar with rinderpest prepared vaccines from emulsions of spleen and lymph-nodes inactivated in the presence of eucalyptus, or by formalin. These inactivated vaccines evoke an immunity which lasts 9–12 months (the usual life of a pig) and they have given quite good results in the control of swine fever.

It appears, however, that the place of tissue vaccine will be taken by the crystal-violet blood vaccines which have been developed as a result of the experiments begun by Dorset (see McBryde and Cole 1936). Dorset and his associates used blood as a source of antigen and tested the value of formalin, ammonia, chloroform, glycerin, and phenol as attenuating agents, but the results were inconsistent. When 0·05% crystal-violet was added to virulent blood, and the mixture was incubated at 37·5°C for fourteen days, it was found to be inactive. This vaccine gave more consistent results, but it readily becomes contaminated with bacteria. It has, however, been prepared on a large scale, and the American work indicates that when it is inoculated in doses of 5–10 ml. in pigs not less than ten weeks old it produces a satisfactory immunity which usually persists throughout the fattening period. The development of immunity is reduced in pigs that are being suckled by immune sows, or in those to which a simultaneous dose of immune serum has been given. All attempts to demonstrate living virus in the vaccine have failed.

In this country Doyle (1942) found that the virus was inactive after three days at 37°C. Since the vaccine is usually incubated fourteen days at 37°C, this provides a wide margin of safety. The vaccine does not produce a solid immunity until twelve days after inoculation, and before that time pigs may be abnormally susceptible; it follows that healthy pigs in infected premises must not be vaccinated. Pigs under a month old from immune sows do not respond to vaccination, owing to passive immunity. Vaccine prepared with the American virus produced a good immunity against various English field strains. Even with 3 ml. doses of vaccine immunity persisted ten months. Many pigs were used in these experiments, and their immunity was tested both by inoculation of virus and by long exposure to infected pigs.

Matthews and Doyle (1943) have carried out further trials and conclude that the vaccine gives a high degree of immunity under field conditions in this country. It has now been made available for more general use.

FOOT-AND-MOUTH DISEASE

Attempts to immunise against foot-and-mouth disease by the serum-simultaneous method have failed because the serum either completely inhibits multiplication of the virus or does not give sufficient protection (Waldmann and Reppin 1935). Vallée et al. (1926) showed that, if the infective lymph and epithelium from foot-and-mouth vesicles were formolised, they produced a fairly good immunity in cattle. This work was confirmed in guineapigs by Bedson et al. (1927), but Waldmann (1930) failed to immunise pigs with formolised lymph, and it was assumed that the vaccine would be of little or no value in cattle. There is evidence, however, that pigs are more difficult to immunise than cattle (Toussieng et al. 1938), and Waldmann et al. (1937) found that formolised epithelium produced a good immunity in cattle; but still no large-scale attempt was made to immunise cattle.

From 1935 onwards Scandinavian workers carried out experiments on the value of foot-and-mouth virus adsorbed on to alumina as an immunising agent (Hansen et al. 1936, Harbo 1940, Schmidt and Oerskov 1935, Schmidt and Hansen 1936a and b, and Schmidt et al. 1936). The vaccines were used in cattle by Schmidt (1936), and further promising results were reported by Fogedby (1939), though there can be little doubt that the vaccines often contained traces of live virus.

Waldmann (1938) slightly modified the vaccine developed by the Scandinavian workers. He added 0·05% formalin to the virus-alumina mixture, and there have been numerous papers on the value of this vaccine, which has been used extensively in the severe foot-and-mouth epidemic which began in 1937 (see Waldmann 1942, Toussieng 1944). The chief veterinary officer (Cabot 1945) described the method of using this vaccine and the results obtained. In Germany, between February, 1938, and April, 1942, some 250,000 litres of vaccine was administered to about 4½ million animals. During those four years disease was reported within

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six months of vaccination on 814 farms out of an estimated number of 460,000 treated herds, and in about 60% of these outbreaks it was due to the incursion of a type of virus different from that used in the preparation of the vaccine. Waldmann (1942) claims that the immunity lasts at least six, and usually eight, months.

Despite the efforts of Continental workers and the high claims made for the vaccine, there occurred in the Reich more than 89,000 outbreaks of foot-and-mouth disease during 1940–41, when facilities for the preparation of vaccine were presumably at their maximum. An adsorbed vaccine inactivated in the presence of anisole was described by Vianello (1940) and has been used in Italy. These adsorbed vaccines have been used on a very large scale because there happened to be a severe epidemic of foot-and-mouth disease when they were being tested experimentally and there was a great demand for a vaccine. Unfortunately there is little evidence to show that they are superior to formolised lymph, which is much simpler to prepare.

While this work was going on, Gräub used exactly the same methods as those used in the preparation of crystal-violet swine-fever vaccine to prepare a vaccine against foot-and-mouth disease (Gräub 1938, Gräub et al. 1940). After considering all the available evidence the Foot-and-Mouth Disease Research Committee decided to conduct experiments on the crystal-violet blood vaccine at Pirbright (Cabot 1945). This vaccine is even simpler to prepare than that made from the formolised lymph and epithelium; the crystal-violet blood mixture required only a few days' incubation at 37°C to become inactive. It produced a good immunity lasting about six months in cattle. There is evidence (Cabot 1945) that many outbreaks of foot-and-mouth disease in this country are due to feeding pigs with swill containing infected meat from the Argentine. The crystal-violet vaccine is now being tested in that country, and preliminary successful results have been reported (Viera and Castelo 1944).

NEWCASTLE DISEASE

Work on immunisation against Newcastle disease has been reviewed by Francis (1947). The chick embryo provides a better source of virus for the preparation of vaccines than does the hatched bird; and though the tissues of the embryo contain a lower titre of virus than do the fluids they are equally antigenic. Formolised vaccines seem to be more effective than those inactivated by other means, including ultraviolet rays; vaccines inactivated in the presence of crystal-violet are not antigenic. Iyer and Dobson (1940) found, rather surprisingly, that passage of the virus on the chorio-allantois produces attenuation for the hatched bird, and it appears that this attenuated strain is being used with success for immunising poultry in India. American workers have confirmed this attenuation but think that the safest method of immunisation is to prolong the short immunity produced with formolised vaccines by an injection of the attenuated virus. Chicks hatched from eggs laid by immune birds do not respond to vaccination, because of the passive immunity transferred by the yolk sac.

DOG DISTEMPER

The work of Laidlaw and Dunkin (1928) on dog distemper is too well known to require detailed discussion. Green (1945) reported experiments indicating that 50 passages of distemper virus in ferrets considerably lowered its virulence for young foxes and dogs.

SUMMARY OF THE FACTS

The work on the production of vaccines against swine fever, rinderpest, and foot-and-mouth disease has been closely linked. In all these diseases the blood and internal organs contain fairly high titres of virus, and in swine fever both of them produce quite good vaccines when suitably inactivated. In rinderpest, and probably in dog distemper, the blood is useless as an antigen, but in foot-and-mouth disease it is much more effective than the internal organs. In Newcastle disease though the embryo contains a lower virus titre than do the fluids it is equally antigenic.

The serum (virus) simultaneous method of vaccination produces a strong and lasting immunity against rinderpest, swine fever, and dog distemper, but in foot-and-mouth disease a proper balance of virus and serum cannot be achieved; often either no immunity is produced or overt disease develops.

In Newcastle disease, rinderpest, and possibly dog distemper, but not in the other diseases, modified live viruses can be used for vaccination.

Formalin is a good, and probably the best, inactivating agent in rinderpest, dog distemper, and foot-and-mouth disease (when infected epithelium and vesicle fluid are used). In Newcastle disease it is probably superior to ultraviolet rays as an inactivating agent. With rinderpest, foot-and-mouth disease, and swine fever highly antigenic vaccines can be prepared if infective material is incubated in the presence of glycerol, crystal-violet, or eucalyptus, but it has not been demonstrated, as it has with formalin, that the process is anything more than a simple heat inactivation, these substances merely helping to reduce bacterial contamination. There can be no doubt that the virus in most of these vaccines is "dead," and immunity is not due to multiplication of virus but to the antigenicity of killed virus protein.

Pigs and chicks from immune mothers do not respond to vaccination during the first few weeks of life, because they have received antibodies via the placenta and yolk sac respectively.

REFERENCES

Bedson, S. P., Maitland, H. B., Burbury, Y. M. (1927) Second Progress Report of Foot-and-Mouth Disease Research Committee. London.
Cabot, D. A. E. (1945) *Vet. Rec.* **57**, 375.
Doyle, T. M. (1942) *Vet. J.* **98**, 51.
Edwards, J. T. (1927) *Trans. 7th Congr. Far East Ass. trop. Med.* **3**, 699.
Fogedby, E. F. (1939) *Vet. Rec.* **51**, 1307.
Francis, J. (1941) *Ibid*, **53**, 622.
— (1946) *Ibid*, **58**, 501.
— (1947) *Ibid*, **59**, 437.
Gräub, E. (1938) *Schweiz. Arch. Tierheilk.* **80**, 524.
— Zschokke, W., Saxer, E. (1940) *Ibid*, **82**, 461.
Green, R. G. (1945) *Amer. J. Hyg.* **41**, 7.
Hansen, A., Schmidt, S., Oerskov, J. (1936) *C.R. Soc. Biol. Paris*, **123**, 717.
Harbo, J. (1940) *Skand. VetTidskr.* **30**, 411.
Iyer, S. G., Dobson, N. (1940) *Vet. Rec.* **52**, 889.
Laidlaw, P. P., Dunkin, G. W. (1928) *J. comp. Path.* **41**, 1, 209.
McBryde, C. N., Cole, C. G. (1936) *J. Amer. vet. med. Ass.* **89**, 652.
Matthews, H. T., Doyle, T. M. (1943) *J. comp. Path.* **53**, 121.
Schmidt, S. (1936) *Rev. Immunol.* **2**, 580.
— Hansen, A. (1936a) *C.R. Soc. Biol. Paris*, **121**, 1236.
— — (1936b) *Ibid*, p. 1242.
— Oerskov, J. (1935) *Acta path. microbiol. scand.* **12**, 262.
— — Hansen, A. (1936) *C.R. Soc. Biol. Paris*, **123**, 721.
Toussieng, E. (1944) *Maanedsskr. Dyrlaeg.* **56**, 49.
— Fogedby, E. F., Frenkel, H. S., van Waveren, G. (1938) *Bull. Off. int. Epizoot.* **16**, 205.
Vallée, H., Carré, H., Rinjard, P. (1926) *Rev. gén. Med. vét.* **35**, 129.
Vianello, G. (1940) *Azione vet.* **9**, 132.
Viera, O., Castelo, M. (1944) *Rev. Med. vet., B. Aires*, **26**, 114.
Waldmann, O. (1930) *Proc. 11th int. vet. Congr.* **2**, 37.
— (1938) *Disch. tierärztl. Wschr.* **46**, 569.
— (1942) *Berl. Münch. tierärztl. Wschr.* July, p. 221.
— Koebe, K., Pyl, G. (1937) *Bull. Off. int. Epizoot.* **13**, 825.
— Reppin (1935) *Z. Infektkr. Hausliere*, **47**, 283.

STREPTOMYCIN TRIALS

PRELIMINARY REPORT

AN account of the Medical Research Council's first trials of streptomycin was given at a meeting of the Tuberculosis Association on Feb. 20.

Dr. GEOFFREY MARSHALL said that it had been decided to test streptomycin in three types of disease: (1) tuberculous meningitis; (2) acute miliary tuberculosis; and (3) one type of pulmonary tuberculosis. In the last group it was obviously difficult to obtain a conclusive answer within a reasonable time; and the first aim had been to work on a more or less uniform group where clinicians would not ordinarily wish to undertake other forms of treatment. Thus the group selected had been young adults with rapidly advancing bilateral lesions of which cavitation was not a prominent feature. Great care had been exercised in selection both by clinicians and statisticians; and where other forms of treatment had been deemed necessary during the course of streptomycin, the case had been withdrawn from the trial.

Altogether, the cases treated with streptomycin in these first trials in 1947 numbered: tuberculous

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meningitis, 138; acute miliary tuberculosis, 31; and pulmonary tuberculosis, 55. The drug was now also being tested in tracheobronchial ulceration and as an "umbrella" in thoracic surgery: and in another series variations in the rhythm of treatment were being tried in an attempt to circumvent the development of resistance.

TUBERCULOUS MENINGITIS

Prof. NORMAN CAPON, reporting on trials in young children with tuberculous meningitis at one centre, emphasised that the daily intrathecal injections were an ordeal for patients and a strain on the staff. For early diagnosis the identification of early choroidal changes had proved helpful.

Streptomycin resistance had developed in only 1 of 29 cases treated. The amount given was 0·6–1·0 g. daily, in four separate intramuscular injections; and in addition 0·1 g. was administered intrathecally. All patients had had intrathecal injections despite the drug's irritant effect; the present aim was to give streptomycin for several months by the intramuscular route, and to administer it intrathecally for a week at a time with intervals between. In 4 cases with block, streptomycin had been given into the ventricles; and 1 survivor had received it intracisternally without ill effects. Toxic effects had not been many or serious, but 1 survivor was deaf. Surprisingly, said Professor Capon, children who had recovered clinically sometimes had a grossly abnormal cerebrospinal fluid (C.S.F.). Did this mean that the terminal results would be less satisfactory than was hoped? Would not healing in itself be a danger in the long run?

Dr. HONOR SMITH, from experience of streptomycin for tuberculous meningitis in children and adults at one centre, concluded that the intrathecal route was essential. Intramuscular injections should be continued for six to nine months and intrathecal for five to six weeks. In fatal cases necropsy had revealed a dense mass of exudate filling the interpeduncular fossa and spreading upwards. Occlusion of the cisterna ambiens resulted in obstruction of the C.S.F. circulation and in hydrocephalus of the communicating type. This exudate hindered streptomycin from reaching the interpeduncular fossa. There was, moreover, occlusion of arteries in the exudate; and arteriography in one of these cases showed occlusion of the anterior cerebral artery and an attenuated filling of the middle cerebral. Other components of this "interpeduncular syndrome" were oculomotor palsy and manifestations of hypothalamic disturbance. Such changes might be observed in non-fatal as well as fatal cases; and it seemed that they might be reversed. Lately instillation of streptomycin into the cisterna chiasmatica had been undertaken, but so far it was impossible to judge results. Clinical experience indicated that no patient was too ill to treat; the prognosis could be decided better by the patient's progress under treatment than by his primary condition. In doubtful cases it was difficult to know whether to await a firm diagnosis, by identification of the bacillus, before starting treatment. In one fatal case, where the diagnosis was established at necropsy, twenty-eight cultures had been negative. Probably it was best to start treatment immediately, before the brain had been irreparably damaged.

PULMONARY TUBERCULOSIS

Dr. DOUGLAS SMITH, commenting on streptomycin treatment in young adults unsuitable for collapse therapy, observed that in some cases streptomycin resistance did not develop. Why should this be? It seemed that resistance was most likely to develop in the presence of cavitation. With regard to toxicity, vestibular disturbance was common; there might be nausea, vomiting, and nystagmus, but after about three weeks these symptoms usually abated somewhat.

Dr. RICHARD BRENT said that under treatment some cases of pulmonary tuberculosis improved for two or three months and then relapsed. Tests indicated that usually drug resistance developed in eight to twelve weeks; cessation of clinical improvement and the onset of resistance usually coincided.

Dr. J. W. CROFTON said that in cases responding to streptomycin therapy the first evidence of improvement was an increased sense of well-being, and radiological improvement lagged behind clinical improvement. Among 31 cases treated with the drug toxic symptoms had been noted as follows: local pain 12, rash 4, nausea, &c., 9, giddiness 11, mouth numbness 3, and eosinophilia 11. Objective tests revealed labyrinthine disturbance months after the end of treatment; this disturbance was best tested by asking the patient to walk down a straight line with his eyes shut. In no case had reactions been severe enough to necessitate interruption of treatment.

PATHOLOGY

Dr. ROBERT CRUICKSHANK said that in tests on sputum evidence of resistance in tubercle bacilli appeared between five and twelve weeks after the start of treatment. Not too much importance should, however, be attached to these findings; it was true that the proportion of resistant strains increased, but qualitative tests were misleading.

Dr. I. A. B. CATHIE said that in tuberculous meningitis the chloride content of the C.S.F. was often no guide to the diagnosis; the most reliable indicator in the C.S.F. was a reduced and falling sugar content. In children at Great Ormond Street the daily dosage was determined on the basis of 0·01–0·02 g. per lb. body-weight. The protracted increase in protein content sometimes observed was a streptomycin effect; and streptomycin itself also caused an increase in the C.S.F. polymorphs. Improvement was sometimes heralded by a fall in the cell content and a rise in the protein content of the C.S.F. At first the blood-sedimentation rate almost always fell; but the rate increased again if the condition was not responding.

RESULTS

Dr. MARC DANIELS described the organisation of these trials, which were designed to use a very limited supply of the drug to the best advantage, with a reasonable hope of reaching statistically valid conclusions.

Preliminary results given by Dr. Daniels justified the conclusion that streptomycin is a powerful weapon in those forms of tuberculosis which hitherto have been almost invariably fatal, though the long-term results are still in question; and that it is a useful adjuvant in some other forms of the disease. The first full report on the meningitis cases is to appear shortly, and this will be followed by reports on the miliary and pulmonary series.

". . . The long-term patient is the chronic patient of yesterday's terminology, who was popularly thought to be hopeless in prognosis and therefore a useless burden on society. We are supposed to know better today. This type of patient claims medical attention for a relatively longer period of time, but not necessarily for an endless period of time. The same illness may produce short-term or long-term effects, depending on the patient and his various natural and acquired defenses against illness. The difference between the short and the long-term patient is thus seen to have been artificially set. There is, in fact, no sharp line of demarcation between the two. . . . The phenomenon of clinical urgency may be subjective, objective, or both. From the standpoint of hospital response, short-term illness is more objective than subjective, while long-term illness is more subjective than objective. In the former case we respond to the call almost instinctively; in the latter case we seldom respond, even after repeated knocking at our doors."—Dr. E. M. BLUESTONE, *Bull. Amer. Coll. Surg.*, September, 1947.

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Modern Hospitals

VII

PLANNING A GENERAL HOSPITAL

SOME CANADIAN SUGGESTIONS

THE many factors which have to be weighed before a hospital is built are concisely set out by the Canadian Medical Association's department of hospital service.[1] We reproduce some of its conclusions.

FIRST STEPS

To establish the need for building or enlarging a hospital, the area to be served must be surveyed to ascertain its extent and population, and the degree to which its requirements are already met: if on the average not more than 70% of the beds in nearby hospitals are occupied, the case for more accommodation is doubtful. Assuming that the need is proved, the number and type of beds must next be decided; and here the answers will depend largely on the character of the community. For example, with an industrial community due allowance must be made for accidents at work; while the number of semi-private and private beds will be governed by the financial status of people in the area. The ratio of beds to population will vary from 4 beds per 1000 in scattered rural areas to at least 6–7 in cities; and the ratio may be even higher if the area is highly industrialised or if it draws patients from a distance.

The site should be large enough to assure reasonable privacy, to permit of future expansion, and to enable vehicles to be parked far enough away from the patients. In deciding orientation it should be recalled that in early summer there is less direct sunshine and heat in a south room than in one facing east or west, and that in summer as a whole a westerly exposure is the hottest. The site should be on high ground with a pleasant outlook, slightly rolling land being preferable to flat.

PREPARING THE PLAN

"There is no such thing as a standard hospital building": hospital planning is constantly changing to suit new techniques, departments, and equipment. Where the hospital is likely to be expanded later, the service departments should, at the start, be constructed to provide for this larger number of patients. For a community of moderate means it is prudent to construct a fair proportion of small, comfortable, inexpensive, private rooms; and since the hospital is likely to be full only for short periods in the year, it may be well to make some of the single rooms big enough to take two beds if necessary.

"The public wards should not be large; even the largest institutions should not have wards of more than six or eight beds, and in the smaller hospitals wards of three or four beds should be the maximum." The present trend is towards flexibility, permitting the conversion of space to different purposes. Generally speaking, patients' rooms and wards should not be permanently reserved for one department or for one sex, since the ratio of medical to surgical, or male to female, patients varies from time to time; but the children's and the maternity departments are exceptions to this rule.

ADMISSION

The entrance lobby should have a spacious, cheerful, and artistic atmosphere, for "first impressions are lasting." At the ambulance entry, besides a small office, an admission room, and possibly emergency operating and fracture-plaster rooms, there may usefully be observation wards; indeed, these are essential in the larger hospitals. They may be used for patients arriving late at night, thus avoiding disturbance of patients in the regular wards, and may also take possible cases of communicable disease.

THE NURSING UNIT

The nursing unit should have between twenty and thirty patients, according to the size of the hospital; too small a unit is wasteful of service rooms and corridors. Usually the floor area allotted to wards is only about 20% of the total floor area of the institution. Adult ward beds require 80–90 sq. ft., and children's ward beds 70–80 sq. ft. Semi-private rooms require 90–125 sq. ft. per bed, and private rooms 135–215.

Wards and rooms should be so planned that the patient does not have to face the window. The ideal arrangement is to place the bed parallel to the exterior wall, for then he can look out of the window. The bottom of the window glass should not be higher than 32 in. above the floor. Each ward or room should contain a wash-basin and small wardrobes; on the provision of lockers in public wards opinion is divided. Ceiling heights of 10–11 ft. are ample for a room or ward of any size.

Each nursing unit of public or semi-private patients requires one quiet or isolation room, about 130–140 sq. ft. in area, for the isolation of very ill or noisy patients. This room should be treated to prevent transmission of noise.

The nurses' station should be in a place where it is easy to supervise the nursing unit, and should be near the lift and staircase. Other ancillary accommodation includes utility or sink rooms, maids' rooms, servery, consulting-room, bathroom (one bath per unit of normal size), and toilet (one for every 10–12 patients).

In the nursing unit internal noises originate mostly in the service area, which should be segregated from the patients' rooms and should if possible open off a sub-passage. Much of the noise in hospitals is caused by equipment placed where it transmits sound to adjacent walls and floors. Care in its choice and installation can do much to abate noise.

SURGICAL SUITE

In the past the surgical suite was commonly placed at the end of a top-floor wing; but in smaller hospitals it may suitably be near the ambulance entrance, thus serving also for emergency work. In the average hospital one operating-room is required for every 50 patients; but in hospitals of only 30–50 beds two rooms may be needed—one for minor surgery.

The system of central sterile supply has now been widely adopted in medium-sized and large hospitals. The central supply department should handle all sterile supplies for the hospitals except instruments and water for the surgical, obstetric, and outpatient departments. Centralisation avoids duplication of units for ward service. A group of semi-skilled workers, under a competent supervisor, can be trained to undertake the necessary procedures, and nurses are thus relieved of duties for which no definite time is allotted in the day's programme. Floor supplies are requisitioned from, and returned to, the central supply for washing, sterilisation, and reassembly. The department should be in a central position, and preferably it should have its own dumb-waiter service to hasten deliveries. It should be divided into 3–6 separate areas for its various duties.

MATERNITY DEPARTMENT

The maternity department should be well isolated from the rest of the hospital to minimise the danger of cross-infection. To conform with the most modern

1. Planning and Constructing the General Hospital. By the Department of Hospital Service, Canadian Medical Association (now the Canadian Hospital Council, 280, Bloor Street West, Toronto, 5).

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nursing principles, cots in the creche or nursery should be in cubicles formed of a metal screen with half-glazed tops. Each cubicle should contain a bassinet, a small supply cabinet, a stool, and a gown hook. The area in each cubicle is from 12 to 16 sq. ft.; and the gross area of the creche will be from 28 to over 30 sq. ft. per bassinet. The entrance to the nursery should be through a room to which babies are brought for medical examination. A creche for premature babies will be needed, large enough to take 8–10% of all those born. The "suspect" nursery should be completely separate from the normal and premature rooms, and should be large enough to take 12–15% of the number in the main nursery. All creches should be heated to at least 75°F, and should be supplied with fresh humidified air with a relative humidity of 45–50%. Their ceilings should be treated against the transmission of sound. A maternity department would be incomplete without an isolation suite with adult beds and bassinets in the ratio of about 1 to 10 of the total in the department.

DIETETIC DEPARTMENT

The first question to be decided is whether service shall be centralised at the main kitchen, or whether food shall be sent in bulk to the ward serveries. Centralised service, which has become popular in the past two decades, is efficient and economical; but it works well only in a compact type of hospital where all patients are in a single building. The size of the kitchen itself may be calculated on the basis of 15–25 sq. ft. per patient; the larger the hospital, the less the area per patient.

Before dining-rooms are planned, it must be decided whether meals are to be served to the staff at one or more than one sitting. Some administrators think one sitting more efficient and economical despite the initial cost of larger rooms. For mixed personnel the trend is towards cafeterias.

DECORATION

The report observes that the "institutional atmosphere" is being overcome through the replacement of white and grey colours by brighter shades. "More and more hospitals are recognising the beneficent effect of colour. . . . Today we see an ever-increasing use of colour tones in window draperies, bedspreads and rugs; pleasing colour effects in walls and floors and attractive finishes in furniture. Decorative effect today is directed to provide as much cheer and 'home comfort' as is consistent with the requirements of sick-room hygiene."

Medicine and the Law

Motorist and Accident Due to Illness

THE Salford stipendiary magistrate last month gave a reserved judgment in a case where a motorist, charged with having driven without due care and attention, raised the defence that the accident occurred while he was for the moment overcome by a "complete mental blackout" owing to illness. The defendant was alleged to have mounted the pavement, scraped along a garden wall, and knocked down and injured three women who were waiting in a bus-stop queue. His car then, it was said, regained the road; he stopped in response to a shout from a woman who was a passenger in it; she alighted, and he drove on. When traced through the damage visibly inflicted on his car, he said he had no recollection whatever of the accident or of the passenger alighting. He stated that he was at the time under medical treatment for biliousness due to fish-poisoning and that at times his brain "went numb." The High Court decision in Kay *v.* Butterworth (1945) was mentioned and applied; the Salford bench fined the defendant £5 under section 12 of the Road Traffic Act (driving without due care and attention) with a further fine under section 22 for failing to stop after an accident. On his undertaking not to drive again until his physical fitness to hold a licence had been decided by the licensing authority, his licence was not suspended.

The case of Kay *v.* Butterworth is worth recalling. Mr. Butterworth, who had been working all night at an aircraft factory, drove his car at 9 A.M. into the rear of a column of American soldiers, injuring 16 of them. His defence was that, at or immediately before the accident, he was overcome by sleep or drowsiness and therefore was not conscious of or responsible for his actions. The magistrates accepted this contention, but in the High Court Mr. Justice Humphreys said that anybody who so drove in broad daylight and full visibility was guilty of a number of offences. If a man allowed himself to drive while asleep he was at least guilty of driving without due care or attention because it was his business to keep awake. If overtaken by sleep or drowsiness, he ought to stop and wait till he recovered himself and woke up. "I do not mean," added his Lordship, "that a person should be made liable at criminal law who, through no fault of his own, becomes unconscious while driving—for example, if he were struck by a stone or overcome by a sudden illness or if the car was temporarily out of control by his being attacked by a swarm of bees or by wasps." In the Butterworth case "the driver must have known that drowsiness was overcoming him." The case was remitted to the magistrates with a direction to find the offence proved. Evidently in the recent case at Salford the driver was not regarded as having been "overcome by a sudden illness." He had, said the magistrate, sufficient knowledge to know that he should not go on driving in the condition in which he then was. He was deemed to have known that his tendency to biliousness, like Mr. Butterworth's inclination to sleep, was a reason why he should not have been driving the car.

The report of the Salford case given in the *Manchester Guardian* of Feb. 21 mentions that it was spoken of as being only the second recorded case of its kind. The principle, however, on which it was decided has been established in the cases of diabetic disability and the much more common cases of alcoholic poisoning which vary in degree. The Humphreys judgment shows that, if the driver knows that he is in a condition in which he cannot, or may not be able to, control the car properly, he must not drive, though sudden and presumably uncontemplated illness still remains a possible defence.

Obituary

FREDERICK McSORLEY

M.D. BELF., F.R.C.P.I.

Dr. Frederick McSorley, a member of the House of Commons of Northern Ireland, died in Belfast, on Feb. 9, at the age of 56.

From St. Malachy's College, Belfast, he entered the Queen's University, graduating M.B. in 1916. Six years later he took his M.D., and in 1930 he was elected F.R.C.P.I. For the past twenty years he had been visiting physician to the Mater Infirmorum Hospital, Belfast, and he was also visiting physician to the Belfast City Hospital. For many years clinical lecturer and examiner in medicine at Queen's University, he also examined for the Royal College of Physicians of Ireland.

His return at the top of the poll at the election of 1945 as one of the M.P.'s representing Queen's was a remarkable achievement, and his popularity in Parliament was unquestionable. Although his views often conflicted with those of the majority, as for example his opposition to the government taking over the hospitals in the new Health Services Bill, he offended no-one; he stood for principle and never indulged in personalities.

Throughout a very full life he was unsparing in his devotion to duty, whether medical, political, or merely social. His colleagues valued his opinion, and gave him their confidence. His sterling qualities and his happy disposition endeared him to everyone, but in his own home, with his family of four sons and two daughters, he was seen at his very best.

E. M. H.

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In England Now

A Running Commentary by Peripatetic Correspondents

PEOPLE in the New York subways can be divided into two main groups—those who chew gum and those who avidly read newspapers or magazines. Some of course do both. The gum-chewers can be again subdivided into the sad and the glad chewers. The sad chewers wear a glum expression and chew ceaselessly, with a slow rhythmical rotary movement. Their likeness to a cow is too striking to be disregarded. The glad chewers, in contradistinction, obviously derive pleasure from the exercise. To them it is not a stern duty but a spontaneous pleasure. Their facial expression is glad and alert, and their jaws move rapidly on a vertical axis, short periods of intense activity being interspersed with longer intervals of rest. While the sad group are silent these latter are highly talkative; one can but admire the dexterity with which they chew and talk at the same time. What an opportunity to determine whether a patient is of manic or melancholic disposition! Surely a packet of gum should be in the attaché case of every psychiatrist.

* * *

Berlin is still an attraction, and when I got a short leave recently I headed straight for it. The bombing is stale news now, of course, but I still was not quite ready for what I saw there—the miles of continuous devastation, the remains of handsome streets, the shells of imposing buildings, and the desolation of the Tiergarten, dotted with flak tower and bunker, leaning drunkenly across the naked trees. The statues of "prominent Germans and animals" are stark and lonely now, a reminder to the new boy of what the place once was. The Reichstag is another sort of monument. Unrepaired after 1933, it is now joined in its bleak hideousness by the shrines of its own destroyers. And the Olympic Stadium where we stayed—what an imposing and depressing sight that is, like a theatre the morning after a first night, full of tawdry grandeur. A huge arena, once the centre of world attention, now the ground for the local C.C.G. football team (the result of their latest game still on the scoreboard opposite the Olympic torch).

After a spell of silent sight-seeing I passed on to the homelier business of looking at German hospitals. Professor G. at one of the larger municipal hospitals attached to the university could not have been more friendly as he showed me round his department, graciously acknowledging the salaams of innumerable assistants and occasional nurses. His list had started at 7 A.M. so I saw only the odds and ends, but the theatre was still crowded. Hardly anyone wore masks and the great man had greeted me in the gloves he wore. Every day he and his minions get up at 5 A.M., do 15 or 20 major operations and then tackle 300 outpatients. His wards are full (too full) but they have only a quarter of the number they held during the war when patients were stacked in treble tiers along the cellars and corridors. Even now some of the subterranean dressing-rooms and theatres resemble a C.C.S. more than a big metropolitan hospital; patients lie around in all states of undress, anæsthesia, and fearful expectancy, but all quite quiet and controlled. The man who was having his empyema wound dressed was thinly shielded from a D. & C.

At the head of each patient's bed was a large board bearing his name and diagnosis. "They don't understand the meaning of neoplasm," said the Professor, "and it is much easier for me." I wondered if, being Germans, the patients were too disciplined to try to find out the meaning of their own (and the others') diagnoses. Certainly the lady with the carcinoma of rectum was as pleased with her hearty greeting as the many girls without their thyroids.

As he sat smoking afterwards the Professor told me next time I came to Berlin to let him know in advance and he would lay on whatever I wanted. What operations would I like to watch? I almost felt that he would do whatever I asked for, regardless of the patient's need. Some drugs are short (notably insulin), dressings are mostly paper, and X-ray film comes almost exclusively from the black market. There was an outbreak of poliomyelitis last summer in Berlin and one case of respiratory paralysis was saved by an iron lung received from the Americans. Before that the hospital had none at all. ("Why not?" Oh, there weren't many cases before the war.) The food, as one might expect, was inadequate, but, being deprived of access to the black market, the patients receive slightly more than the general ration and get 1600–1800 calories a day, I should guess.

Chief impressions were of the absence of anæsthetists and of a blood-bank. There is no specialist anæsthetist attached to the hospital (is there anywhere in Germany?) and all anæsthetics are given by housemen or sisters. Locals, spinals, and epidurals are common, with hexobarbitone-induced open ether the standard general. There was no anæsthetic room and the patients were put to sleep in the fuss and glare of the theatre. For blood they rely on a list of grouped volunteers living nearby. "But what about an emergency, a ruptured ectopic, for example?" Then they grab the nearest nurse or student. The idea of a blood-bank didn't appeal; they didn't think people would volunteer, because there would be no payment.

Probably he said much more, but my German is pretty shaky and I was often nodding furiously when I did not understand a word. The question about the ruptured ectopic required every corpuscle of my concentration and ingenuity and left me pale and pulseless.

* * *

So your rather snooty critic (see review of Anna Freud's *Psycho-Analytical Study of the Child*, Feb. 21) finds it hard to believe that death and destruction play a leading part in the lives of the children of the ordinary reader? If every child, he says, is so preoccupied with hate, rage, mutilation, and slaughter, propagation of the race must seem a misguided enterprise. I seem to recall A. P. H. in *Punch* also bawling out a so-called science which depicts our offspring entering this world not trailing clouds of glory but breathing lust and murder.

All right! Here are some clinical observations made on two dear little fellows aged 4 and 6, the children of one of your ordinary readers, healthy chaps praised by all their seniors and now picking their way through the quagmires of the so un-British Œdipus complex.

"I'm going to Jesus but you're for the crocodiles."

"The next time Daddy is lying under the car to mend it, it will start going and run him over and break him in pieces."

"When we go for our summer holidays Daddy will be in a special carriage at the end of the train, and the door will fly open, and he will roll down the side of the track and be eaten by crocodiles at the bottom."

Daddy will also be sawn in half, eaten up, broken in pieces, chopped up, minced, mangled, sent to prison, and generally come to a bad end.

And these are only the effervescence of their conscious minds! However, the little dears make all these remarks with such engaging friendliness and mirth that I haven't the heart to tan their hides, and when we all went to the Zoo the other day and actually saw some crocodiles they were most solicitous in their endeavours to stop me from leaning too far over the bar. Still, perhaps that's only to be expected if they're feeling a bit guilty; after all, their eyes did light up when we watched the lions at feeding-time.

* * *

The peripatetic correspondent a few weeks back who was so upset by candidates' spelling and grammar might pause to consider how many of the defaulters were writing in a language not their own, for there is no lack of foreign students these days. In several languages, German and Urdu among them, the order of the words is altered, the verb being put at the end and phrases transposed. I shall never forget the sensation on a crowded ward round when an Indian student asked a patient with a cystocèle: "Do you laugh when you pass water?"

* * *

And then there was the story of the sadist who married a masochist and they both lived happily ever after. . .

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Letters to the Editor

THE PATIENTS' HOSPITAL

SIR,—The article on hospital reform by Mr. Parry (Dec. 13) and your annotation on the patients' hospital (Feb. 21) appear to call for some comment.

Referring to the old problem of waking patients too early you say: "Patients think it unnecessary that they should be wakened and washed at 5.30 A.M. when they are not to breakfast until 7." Quite so, but patients and even doctors may not always appreciate just why this happens. Mr. Parry says simply: "The only reason for this practice . . . is to allow the nurses to get ready for the doctor's visits," but I presume he will admit that these visits have to be done some time? He goes on to say that "a simple rearrangement of hours . . . can be carried out with little difficulty," given good will and determination. This is to dismiss the problem altogether too simply. The fact is that the nursing staff have a set round of routine duties to get through every morning, which would still have to be done at about the same hour whether the doctors came at 10 A.M. or not at all. The same round of temperatures, washing, bedpans, and "backs" has to be done some time every day, and, for the sake of temperatures at least, to some approximately kept time-table. One nurse may have to make 10 beds and to take and record 20 or more temperatures within the period between waking and breakfast; how many of us have ever watched the ward activities at this hour? I suggest it is not so much a problem of simple rearrangement and good will, as Mr. Parry states, as one of adequate numbers of nursing staff; and by this I mean a 100% or 200% increase.

When we pass to the consideration of other points raised in these articles on hospital reform, we find the difficulties mounting. We are led to infer that if the patients are not to be wakened till 7 A.M., the doctors' rounds must wait; till when? In many hospitals now, dinner is served as early as 11.30 A.M., and frequently at 11.45 A.M.; thus even if the clinical rounds begin at 10 o'clock, only 1¾ hours is available for this purpose in the morning. Or is it suggested that the staff shall visit their beds during the general hubbub of washing, bed-making, and enema-giving, which by some up-to-date system of staggering has been spread out throughout the day? Perhaps the doctors will find time to visit their patients in the afternoon; this is already, of course, normal procedure in many hospitals, though it is notoriously an unpopular time for patients (whose comfort must at all costs be considered), because they quite reasonably want to enjoy a nap at this time. But worse is to come, for we are told that visitors should be allowed every day, and not merely two or three times a week. This, Mr. Parry tells us, is "simply a question of ward routine"; I suggest that he has a tendency to over-simplification. The visitors must either come between 2 P.M. and tea-time (3.30 P.M.), when once again the unfortunate doctors will be prevented from doing their rounds, or after tea from 4 P.M. to 6 P.M. But in most wards from 4 P.M. to 6 P.M. the same busy round of bed-making, washing, and temperatures has to begin again, and anyone who has visited the wards at this hour will have been aware of the frantic rush that goes on in order to get through the work. Moreover, this is the hour when junior resident staff in many hospitals have the opportunity to do their own essential work; sometimes it is the only time of day when they can see their patients undisturbed, write up notes, and above all, in medical wards at any rate, carry out those minor surgical procedures which are time-consuming and could not be done during the day—the paracentesis, the taking of blood-specimens, the artificial-pneumothorax refill, the lumbar puncture, &c. This is not all; we are told in connexion with children's wards that visitors should be allowed *at all hours*, to suit not the nurses but the mothers. This may be an ideal arrangement in a perfect world, but under conditions at present prevailing where is it all going to end?

That patients should be wakened as early as 5.30 A.M. (and I have suffered from it myself) is undeniably an unhappy state of affairs which in years to come, when there is a free flood of entrants to the nursing profession, on a scale of say one to every 2 patients, may be remedied. Perhaps further progress may discover other methods of cramming 30 hours' work into a 24-hour day; but that these shortcomings should be laid at the door of the medical staff, of bureaucracy, or of red-tape—to quote phrases used in Mr. Parry's article and your annotation—is not true to the facts.

The opening paragraph of Mr. Parry's article says that in too many hospitals it is forgotten "that they were founded not for the benefit of doctors, nurses, or committees of management but to help to restore the patients to health." I know little of committees of management, but I question whether the doctors or nurses of any hospital have ever really considered that their institution was founded for their own benefit, and the sentence seems to cast a slur unjustified by the facts in the overwhelming majority of cases.

To close on a note of agreement: your remarks about the training (or lack of training) of housemen to acquire a closer personal acquaintance with their patients are very generally true. A little reassurance, a little explanation, and a few inquiries into their family life—the problems would take only a few minutes in each case, and attention to them would make all the difference to the sick; in this respect I believe many hospitals do leave the patient with an impression of a somewhat soulless machine, little concerned with problems other than those of scientific interest. Many housemen will say that they haven't time, and one asked me, "What is the use of me asking her about her home life and how many stairs she has to climb? I can't do anything about it"—a remark which showed that he had not yet learnt that a sympathetic inquiry alone may do much to comfort a patient. Nor, as you say, are they generally taught to give the family doctor a reasonable account of the case; too often the report consists of a list of impressive pathological reports and a terse (to the doctor often obscure) statement of treatment carried out in hospital.

Leamington Spa. W. M. PRIEST.

FATAL HYPOGLYCÆMIA IN A DIABETIC

SIR,—In your issue of Feb. 7 Dr. Winkler describes a case of fatal hypoglycæmic coma in a diabetic. An outside doctor unfortunately gave the patient 30 units of protamine zinc insulin before admission to hospital, and I admire the author's restraint in reporting this strange therapeutic procedure. The patient remained unconscious for nine days; he was pyrexial; and he had neurological signs—bulbar palsy, absent pupillary reflex, spasticity, forced grasping, and jacksonian fits. Dr. Winkler attributes death to circulatory failure from salt depletion in hypoglycæmic coma. I should like to comment on this conclusion under two different headings:

1. It seems unlikely that the patient died of hypoglycæmia. His blood-sugar was high from the second day onwards, with a maximum of 330 mg. per 100 ml.; and although no blood-sugar figures are given after the third day (at 11 A.M. it was 250 mg. and at 2 P.M. 230 mg. per 100 ml.), the urine was loaded with sugar until the very end. It is regrettable that no blood alkali-reserve estimations could be done, but the strongly acid reaction of the urine suggests that the alkali reserve was low. Under these circumstances it is questionable whether it was wise to treat the patient mainly with glucose transfusions and feeds, with only "occasional" doses of 10 units of insulin on the first day (the total is not stated). It is still not sufficiently realised that in diabetes glucose administered without adequate insulin cover only accelerates dehydration, anuria, and pancreatic exhaustion (cf. Root and Carpenter, and Root,[1] who point out that, at a blood-sugar level of 500 mg. per 100 ml., there are 500–700 g. of useless sugar in the tissues). Astwood [2] demonstrated that gross excess of sugar in the body may be toxic: if dogs are given 1·7 g. of glucose per kg. body-weight per hour they die within seventy hours. We are given but few data about the patient's diabetes before the onset of coma; however he could exist on a "free" diet with only 20 units protamine zinc insulin, so his condition could not have been very serious. In spite of this, severe degenerative changes in the pancreas were evident at necropsy. These changes did not accord with the previous clinical picture, and may have been caused by gross exhaustion during the last, fatal illness.

1. Root, H. F., Carpenter, T. M. *Amer. J. med. Sci.* 1943, **206**, 234. Root, H. F. *J. Amer. med. Ass.* 1945, **127**, 557.
2. Astwood, E. B. *J. clin. Invest.* 1942, **21**, 621.

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2. The neurological signs are attributed to cerebral changes during the first hypoglycæmic attack, but the evidence for this is not convincing. The symptoms and signs described would also fill the bill for Wernicke's encephalopathy (encephalitis hæmorrhagica superior). We are not told what diet the patient had before the attack; but he was given hardly anything but large doses of carbohydrates for ten days, during which his sugar metabolism was grossly deranged, and he had no intake whatever of thiamine and nicotinic acid. It is well known that the body cannot store these vitamins, that their lack renders the breakdown of the sugar molecule incomplete, and that the central nervous system is extremely sensitive to any disturbance of carbohydrate metabolism.

It is therefore conceivable that avitaminosis-encephalopathy was precipitated by the treatment, and possibly the neurological signs called for massive doses of thiamine and nicotinic acid once large doses of sugar had been given.

Colindale Hospital, London, N.W.9. A. ERDEI.

CERVICAL-ROOT IRRITATION

SIR,—The orthodox picture of cervical-root irritation, as described by Dr. Milner (Dec. 13, p. 888), never has been wholly confirmed by clinical or pathological evidence. There is no demonstrable proof of the ancient belief that pain of uncertain origin must be due to pressure on nerve-trunks or nerve-roots. By this belief our diagnostic problems are simplified; for pain of a certain distribution automatically suggests root-pressure, and nothing is left for us but to discover what is causing the pressure. At different times different causes of root-pressure have flourished; today only two receive wide support—(1) arthritic narrowing of intervertebral foramina, and (2) herniation of intervertebral discs. Let us see what the known facts of morbid anatomy have to tell us of these two causes:

1. *Narrowing of Intervertebral Foramina.*—(*a*) By arthritis. Few pathologists can spare the time for the laborious job of examining post mortem the intervertebral foramina of arthritic patients. But Schmorl,[1] who made them his life study, wrote: "Neither the arthritic change, nor the lippings on the edges of the vertebræ and their surfaces, even though these changes may be as enormous and grotesque as possible, produce any appreciable narrowing of the intervertebral foramina." Fagge[2] and Ehrhardt,[3] who examined the spinal columns of patients with advanced ankylosing spondylitis, saw little evidence of narrowing of the foramina. C. W. Buckley[4] wrote recently: "It is a striking feature of the whole process that . . . the spinal canal and foramina are not, as a rule, encroached upon."

(*b*) By tumour growth. Dumb-bell tumours that grow through the intervertebral foramina and press on the nerve-roots are often not painful.[5] C. A. Elsberg[6] found pain to be a feature of only 22 out of 47 cases of perineural fibroblastoma arising from nerve-roots.

2. *Intervertebral Discs.*—The intervertebral disc (according to the theory) is an extradural tumour causing pain by pressing on nerve-roots. If the theory is correct, pain should be a special feature of extradural neoplasms. But an examination of clinical records shows that it is not.[7] Elsberg[7] wrote: "The early symptoms are often vague in character, root pain infrequent, contralateral motor disturbances and contralateral paræsthesias . . . are often observed." Extradural cysts, which grow slowly and erode laminæ and vertebral bodies by pressure, usually have a painless course.[8] Tumours of the cord, many authorities agree,[9] often cause little pain.

The root-pressure theory of pain illustrates well the bankruptcy of our views on pain—ubi pain, ibi pressure. I cannot believe, as a rule of thumb, that the dynamic sensation of pain is merely the passive effect of mechanical pressure.

Melbourne. MICHAEL KELLY.

ARSENICAL ENCEPHALOPATHY TREATED WITH BAL

SIR,—In view of the benefit from British Anti-Lewisite (BAL) in arsenical dermatitis, reported from the BAL Conference of the Medical Research Council,[10] the following case of arsenical encephalopathy which recovered after BAL therapy seems worth recording.

A man aged 26 was admitted to a military hospital on May 20, 1946, for treatment of penile warts. He had no clinical signs of syphilis, and the family history did not suggest heredo-syphilis.

On May 21, 1946, and June 1, 1946, blood Wassermann and Kahn reactions were positive. The Paul-Bunnell test was negative on June 1, and the leucocyte-count was 7250 per c.mm. (polymorphs 74%). There was no history of recent illness, penile sore, or urethral discharge. In view of the serological results latent syphilis was diagnosed, and it was decided to treat the patient with 2,400,000 Oxford units of penicillin (60 injections each of 40,000 units three-hourly from 3 P.M. on June 5) and ten injections, one each day, of 60 mg. of 'Mapharside,' beginning on June 7. On June 12 the leucocyte-count was 12,300 per c.mm. (polymorphs 74%). The patient completed the penicillin injections and by June 14 had received 480 mg. of mapharside.

On June 15 at about 8.30 A.M. patient had an epileptiform convulsion. He was kept under observation pending a decision about whether this was idiopathic or heralding encephalopathy. He remained comatose, and some two hours later he vomited several ounces of greenish fluid and showed generalised slight twitching, most marked on the right side. Encephalopathy was then diagnosed. He remained in coma for 48 hours, the depth of coma becoming gradually less.

On June 15, 8 ml. (400 mg.) of BAL ('ox 217') was given intramuscularly—2 ml. (100 mg.) at 11 A.M., 3 ml. (150 mg.) at 3 P.M., and 3 ml. (150 mg.) at 7 P.M.—and 5% glucose saline was given by slow rectal drip. For some hours after the onset patient had a subnormal temperature and feeble pulse and was kept flat in bed. When this initial shock-like phase had passed off, the head of the bed was raised on high blocks. Patient remained comatose and twitching; he vomited some ounces of greenish fluid on several occasions. His temperature rose from 96·8°F at 11 A.M. to a maximum of 102·4°F at 6 P.M. At 5.30 P.M. about 16 oz. of clear urine was withdrawn by catheter. Nothing abnormal was found in his urine.

June 16.—In the early hours of the morning patient was occasionally restless and he resented being touched. At 3 A.M. the rectal drip was discontinued. During this day the temperature ranged from 99·2° to 102·2°F and pulse-rate from 84 to 90. Three doses, each of 3 ml. (150 mg.), of BAL were given intramuscularly at 11 A.M., 3 P.M., and 7 P.M., a total for the day of 9 ml. (450 mg.). At 2 P.M. patient spontaneously voided 20 oz. of urine. There was still occasional twitching of the body and limbs, but this was less frequent than on the previous day. At 7 P.M. the rectal drip was resumed.

June 17.—At 5 A.M. patient was semiconscious and took 5 oz. of water by mouth. His temperature fell to 98°F and pulse-rate to 68, and from 4 A.M. on June 17 there was no further pyrexia. He appeared to be sleeping normally. At 11 A.M. he was given 2 ml. (100 mg.) of BAL intramuscularly, and immediately after this injection he suddenly appeared to be conscious and answered some questions; he was rather confused and negativist. A further 2 ml. (100 mg.) of BAL was given intramuscularly at 4 P.M., bringing the total dosage to 21 ml. (1050 mg.) in three days.

June 18.—Patient seemed clear and normal in mind, and physically not appreciably affected. His tendon and pupil reflexes were normal. He had no recollection of speaking to me on the preceding day. He was kept under observation for about a week after recovery and appeared to have no sequelæ.

1. Cited by Wartenberg, R. *J. nerv. ment. Dis.* 1944, **99**, 877.
2. Fagge, C. H. *Trans. path. Soc. Lond.* 1877, **28**, 201.
3. Cited by Buckley, C. W. (ref 4).
4. Buckley, C. W. *Rep. chron. rheumat. Dis.* 1935, **1**, 77.
5. Meyer, B. C. *Arch. Neurol. Psychiat.* 1947, **58**, 108. Money, R. A. *Med. J. Aust.* 1947, ii, 281. Rowher, C. J. *J. Neurol. Psychopath.* 1924, **5**, 220.
6. Elsberg, C. A. *Bull. neurol. Inst. N.Y.* 1933, **3**, 124.
7. Ehni, G. J., Pugh, D. G. *Proc. Mayo Clin.* 1944, **19**, 513. Elsberg, C. A. *Surg. Gynec. Obstet.* 1928, **46**, 1. Friedman, E. D. *Med. J. Rec.* 1927, **126**, 734. Soltz, S. E., Jervis, G. A. *Bull. neurol. Inst. N.Y.* 1937, **6**, 274.
8. Adelstein, L. J. *J. Bone Jt Surg.* 1941, **23**, 93. Cloward, R. B., Buoy, P. C. *Amer. J. Roentgenol.* 1937, **38**, 681. Good, C. A., Adson, A. W., Abbott, K. H. *Ibid*, 1944, **52**, 53. Hyndman, O. R., Gerber, W. F. *J. Neurosurg.* 1946, **3**, 474. Kelly, T. S.-B. *Lancet*, 1937, ii, 13. Mayfield, F. H., Grantham, E. G. *Surgery*, 1942, **11**, 589. Turnbull, F. *Canad. med. Ass. J.* 1939, **41**, 250.
9. Learmonth, J. R. *Brit. J. Surg.* 1927, **14**, 397. Rogers, L. *Lancet*, 1935, i, 187. Sachs, E. *J. Amer. med. Ass.* 1936, **107**, 188. Spurling, R. G., Mayfield, F. H. *Ibid*, p. 924.
10. *Lancet*, 1947, ii, 497.

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During the acute phase of the illness lumbar puncture was considered, but in the absence of signs of compression, and in view of its doubtful value, I decided not to do this, since patient was restless, and a general anæsthetic would be necessary, which was considered undesirable. Both oxygen and oxygen with 5% carbon dioxide were at hand; but, since patient showed no respiratory distress and remained of a good colour, they were not used. His respirations throughout were regular but shallow.

While this result is encouraging, no opinion is expressed about the exact rôle played by BAL in producing it.

I wish to thank Colonel W. P. Croker, officer commanding Royal Victoria Hospital, Netley, for permission to publish this case.

Todmorden, Lancs. R. C. WEBSTER.

SPEECH AFTER REPAIR OF CLEFT PALATE

SIR,—I was naturally interested in Professor Bentley's article in your issue of Dec. 13.

The series of cases is small and can hardly be said to provide conclusive evidence with regard to the value of pharyngoplasty. A long experience of cleft-palate surgery convinces me that pharyngoplasty is not always necessary, but in defence of my own practice there are few cases in which I feel I dare omit this part of the operation. Professor Bentley will recognise that I had to learn palate surgery the hard way, and a somewhat stubborn and conservative attitude is only to be expected. Certainly there remains quite a large group of cases in which pharyngoplasty is necessary if good results are to be expected; this applies particularly to the older failed or neglected cases.

The change in the outlook of the sufferer from cleft palate is perhaps best demonstrated by the remarks of the late Mr. G. E. Waugh at a meeting of the Royal Society of Medicine in 1911:

> "Mr. Waugh remarked that the discussion so far had turned largely on the mere mechanics of the problem concerned in closing a cleft—i.e., a certain deformity was given and a certain limited amount of tissue provided for bridging across that cleft. But, so far, no surgeon had dealt thoroughly with the topic of what purposes it was hoped to achieve by effecting the closure of the cleft. The last case which Mr. Berry showed provided a text for remarks upon that aspect of the problem. It was one of an interesting series of cases with structural alterations produced as the result of surgery, upon which he thought any surgeon might congratulate himself. Yet that patient seemed to be the only one amongst the whole of those shown —probably nearly 100 in number—who was able to come and speak to his fellow beings, and who was not obviously betrayed by his speech as being the victim of cleft palate."

Newcastle-on-Tyne. W. E. M. WARDILL.

TESTING OF HEARING-AIDS

SIR,—Questions were recently asked in the House of Commons about the 'Medresco' hearing-aid, the suggestion being that by July it may have been outdated by the more recent advances of private hearing-aid firms.[1] It was suggested that the Government should devise a better research policy.

This hospital department is now working a comprehensive scheme in which all existing types of hearing-aids, and others as they are introduced, will be tested by a panel of representatively selected deaf patients, using scientifically controlled methods and precision-built testing gear. Deaf patients presenting for advice on the suitability of a hearing-aid are tested in less detail but by the same methods. Preliminary selection is made, the patient then trying the recommended instrument at home and under working conditions for a week or a fortnight. (This home trial is permitted by all those hearing-aid firms which conform with the recommendations of the National Institute for the Deaf.) If the 'Medresco' aid proves generally less satisfactory under test than other instruments, this fact will be made known. If a privately manufactured aid be found to suit a given patient better than the Government aid, then the patient will be told so.

As this work progresses the department will make more positive recommendations. RALPH F. NAUNTON.

Deafness Clinic, Royal Ear Hospital, London, W.C.1.

1. See *Lancet*, Feb. 21, p. 308.

E.B.S. AS AN INFORMATION BUREAU

SIR,—The Emergency Bed Service has now been in operation for nearly 10 years and experience has shown that it can be of real assistance to general practitioners. Hitherto it has dealt solely with finding beds for acute patients requiring immediate assistance. In the course of this work it has become apparent that doctors would be greatly helped if the service would give them guidance as to the facilities other than inpatient treatment available for their patients. The time and place of outpatient clinics; such agencies as there are to help chronic patients; details of ambulance services, and so on, are all matters on which from time to time doctors require advice, and an endeavour has now been made to acquire the information necessary to answer such inquiries.

The service cannot hope to be omniscient, but it seems likely that most questions of this nature can be answered if the reply is not needed instantly and the service is allowed time to make inquiries. Where the answer is already known it will of course be given immediately.

It is proposed therefore to give a trial to a scheme by which the E.B.S. will extend its functions to providing doctors with information on points arising out of their work. Inquiries should be telephoned to Monarch 3000.

R. E. PEERS
London, E.C.2. Secretary.

TRANSPLANTATION OF THE URETER FOR TUBERCULOUS CYSTITIS

SIR,—In their article on Feb. 21, Mr. Pybus and Mr. Jones recommend transplantation of the remaining ureter into the pelvic colon for the relief of symptoms due to intractable vesical tuberculosis when this occurs in spite of the removal of the tuberculous kidney responsible for the bladder lesion; and they give an account of 4 cases so treated.

I can testify to the benefits of the procedure in this category of patients. As the visiting urological surgeon to Robroyston Sanatorium, Glasgow, I see a considerable number of patients whose bladder capacities have become reduced to thimble-like dimensions. Although many of these men and women are free from any other active tuberculous lesion, the severe frequency or total incontinence from which they suffer results in complete invalidism and they live in a state of misery which is hardly to be borne. Yet a successful transplantation will enable them to regain complete urinary control, to retain urine 3–4 hours or longer, and to return to a normal social existence as well as gainful employment.

An important aspect is that, as a result of back-pressure from the contracted bladder or from stenosis of the ureteric orifice by its involvement in the spreading inflammatory process, dilatation in the ureter and pelvis of the remaining kidney gradually supervenes. When these changes manifest themselves transplantation is not only a method of relieving intolerable symptoms but a life-saving measure; for if carried out in time it will prevent progressive renal destruction and consequent death from renal failure. The following account of a patient who left my care only a few weeks ago is illustrative.

I was asked to see urgently a woman in the early fifties who, I was informed, had been completely anuric for 36 hours. She had been operated on by me twelve years previously when the right kidney was removed for tuberculosis, the left one being uninfected. When last examined two years after operation, the urinary frequency had been about 2-hourly, but this had gradually worsened until latterly she had required to void every twenty minutes night and day. When I saw her with her doctor, the latter was surprised that her left kidney, which only a few hours earlier he had found to be palpably enlarged and tender, was now no longer so. Furthermore, she had suddenly begun to void urine incontinently.

She was admitted to hospital, and during the next ten days, whilst on forced diuresis, had a satisfactory daily urinary output though she remained completely incontinent. Excretion urography showed no pyelographic shadow whatsoever. The urine was tubercle-negative. Transplantation of the ureter was carried out by the extraperitoneal method. The ureter was of thumb-like diameter and tensely distended. After it was divided, there was a copious flow of urine and the walls

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of the ureter, which were not infiltrated, became quite flaccid. Subsequent examination of urine collected from the ureter showed it to be uninfected and tubercle-negative. When she left hospital three weeks after operation her diurnal frequency was 4-hourly and she could sleep the whole night without disturbance.

It would of course have been preferable to have carried out the transplantation in this case before the effects of back-pressure had become so pronounced, for the renal damage is now probably irreversible though a measure of resolution in the dilatation can be expected.

I have now treated by this method 25 patients with tuberculous vesical contracture. It was the subject of a communication I made to the International Society of Urology in August last, and the paper can be referred to in the publication of that congress. Though the procedure is not without its hazards, the immeasurable relief which it offers justifies its adoption.

Glasgow. ARTHUR JACOBS.

SOUTH-WEST METROPOLITAN REGION

SIR,—At the Sutton Emergency Hospital a medical staff representative committee has recently been formed, one of whose objects is to promote coöperation between this hospital and others in the South-west Metropolitan region. We understand that similar committees are already in existence or are projected in this region, and we should welcome news of such activities in the general aim of forming a South-west Metropolitan Regional Hospitals Association similar to that already established in Liverpool and proposed in the North-east Metropolitan region.

D. SHAW
Chairman.
D. E. BUNBURY
Vice-chairman.
A. R. SAMUEL
Secretary.

Sutton Emergency Hospital,
Brighton Road, Sutton, Surrey.

TREATMENT OF ARTHRITIS BY INTRA-ARTICULAR INJECTION

SIR,—I should like to comment on the article by Dr. Baker and Dr. Chayen on Jan. 17 and their letter last week, in the light of personal experience with intra-articular injections in 29 consecutive cases of coxarthritis treated in the past four years. Nearly all these cases improved.

One of the criteria of successful injection into the hip-joint enumerated in the article is the complaint of pain going down to the knee. This, I believe, is not an accurate guide since periarticular and even intramuscular injections may give this local or referred pain during injection.

Baker and Chayen advise patients to perform passive exercises immediately after the injection and during the period of "anæsthesia"; but surely this passive movement will increase the rate of absorption of the injected fluid and thus reduce the period of "lubrication" which these authors hold to be the main cause of benefit? In my opinion the operator should move the limb through its full range immediately after injection in order to distribute this fluid evenly through the synovial cavity, but during the next two days unnecessary passive movements should not be given.

Regarding active non-weight-bearing exercises in the intervals between injections, I think there is a danger that home bicycling exercises, unless closely supervised, may increase the flexion deformity. Active exercises should aim at strengthening the quadriceps, abductors, and tibialis muscles, and at relaxing the spastic adductor and iliopsoas. These are better re-educated by exercises in the recumbent position twice daily. The assumption of improved posture of the lower limb in relation to the pelvis will help to restore muscle balance.

In the assessment of results, absence of pain is not always a criterion of improvement: I often welcome a further access of mild pain in the back or outer side of thigh, since this reflects the increased work given to previously under-used muscles and indicates return to a more normal body posture.

Lastly, the whole patient and not only the hip-joint should have attention, especially with metabolic disturbance or blood dyscrasia, or where there is active infective arthritis.

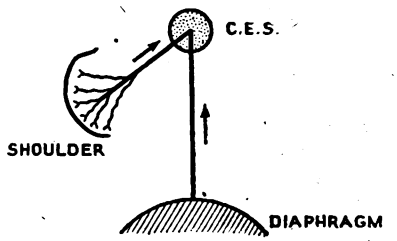
London, W.1. M. M. DOBSON.

VISCERAL PAIN

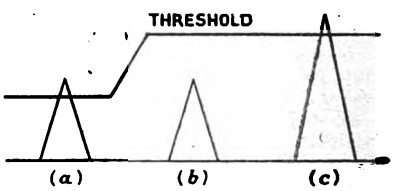
SIR,—The theory propounded by Professor Cohen in his most interesting paper of Dec. 27 appeals to me as a logical and reasonable one for the very good reason that I have recently arrived at practically the same conclusion in connexion with diaphragmatic pain.

For several years I have pondered this question: Why did Morley[1] find that anæsthetisation of the shoulder area supplied by C III, IV, and V abolished or greatly diminished pain in this region produced by stimulation of that part of the diaphragm innervated by the phrenic nerve? I felt that his theory of peritoneo-cutaneous radiation was not the answer, and in discussing the localisation of visceral pain I wrote[2]: "My personal view is that when the central portion of the diaphragm is irritated shoulder-tip pain will occur (*a*) if all fibres of the descending cervical nerves mentioned are completely anæsthetised, and (*b*) if even a fore-quarter amputation were performed"—that is, of course, provided the stimulus is adequate.

To test Morley's theory I carried out several experiments. In two patients I completely infiltrated with procaine the skin and subcutaneous tissues innervated by C III, IV, and V. I then watched, for about an hour, the action of the diaphragm through a fluorescent screen. The motor function of the diaphragm remained normal and unaltered after the injection of the shoulder region. These observations confute the suggestion that shoulder pain may have been abolished (in Morley's cases) because the phrenic nerve was anæsthetised. Thus Morley was right when he stated that "a possible fallacy in the experiment—viz., anæsthesia of the phrenic nerve—need not be considered."



Like Woollard, Roberts, and Carmichael,[3] and other observers interested in this subject, I have noticed that when the phrenic nerve is crushed under local anæsthesia the patient always flinches and complains of pain in the shoulder. This operation of phrenic crush or phrenic avulsion requires anæsthetisation of only a small area; and this appears to be the reason why Morley has claimed that pain may still be experienced because radiation to the unanæsthetised area is possible.



Through the courtesy of Dr. D. H. Smith, of Ashludie Sanatorium, and Mr. R. S. Barclay, the thoracic surgeon, I had the opportunity of completely anæsthetising the tissues in the shoulder region supplied by C III, IV, and V. When the phrenic nerve was crushed the patient flinched and complained of pain which he located in the middle of the infiltrated area—i.e., about 2 in. above the middle of the clavicle. "Shoulder-tip" is not a good term to describe the localisation of diaphragmatic pain. It implies that the pain produced is confined to a small area—the tip of the shoulder—whereas we know, and Morley has illustrated, that this particular pain is usually located in a much larger region which may extend from the clavicle over the shoulder to the level of the spine of the scapula—pretty well the site which would have been occupied by the diaphragm had it maintained its primary relative position. The extent of the pain depends on the number of afferent nerve-fibres in action. I prefer the term "diaphragmatic pain" which indicates

1. Morley, J. Abdominal Pain. Edinburgh, 1931.
2. Brown, F. R. *Brit. med. J.* 1942, i, 543.
3. Woollard, H. H., Roberts, J. E. H., Carmichael, E. A. *Lancet*, 1932, i, 337.

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both where the pain is produced and the position to which it is projected by the cortical centre.

The diaphragm, like many other organs—e.g., the appendix and testis—received its nerve supply before it migrated. I believe that localisation of pain (and other sensations) is, like function, predetermined by anatomical structure. Once innervation is established future migration makes no difference to localisation of pain. In the case of the deeper structures there are no channels through which the brain can be re-educated; the reference map in the brain is completed at an early stage of embryonic life. So far as the sensorium is aware, the diaphragm is still in its early embryonic position; hence diaphragmatic pain is projected to the shoulder region. MacKenzie and his disciples were convinced that certain pains were referred to the skin. I believe that pain is projected to a certain position long since predetermined, and that the presence or absence of tissue in that position is immaterial. Pain in a phantom foot is as well localised as it was before amputation, but a somewhat stronger stimulus may be necessary to evoke pain.

To return to the effect of anæsthetisation of the shoulder on diaphragmatic pain. My view is simply explained with the aid of a diagram (see figure) instead of a formula (Cohen). The central excitatory state (C.E.S.) is built up by impulses which reach consciousness and thus determine the threshold level. Sherrington used this term, C.E.S., in connexion with motor activity, but I consider it equally appropriate for purely sensory phenomena. Certain conditions lower the threshold; others raise it.

(*a*) Under spinal anæsthesia a small part of the central portion of the diaphragm is stimulated. This excites pain impulses which reach the threshold and evoke pain in the shoulder.

(*b*) The shoulder area is anæsthetised. The threshold is raised because impulses from the anæsthetised area cease. The same strength of stimulus as in (*a*) is now inadequate—i.e., it does not reach the raised threshold, and pain is not evoked.

(*c*) The phrenic nerve is crushed. All (instead of a few) of the afferent pain nerve-fibres are stimulated—the maximum stimulus—and pain is evoked in the shoulder because the stimulus is now adequate and reaches the raised threshold. "We may say then that an adequate stimulus may be such from its quantity rather than from its quality."[4]

Dundee. F. R. BROWN.

NOSE AND SKIN CARRIAGE OF STAPHYLOCOCCUS AUREUS

SIR,—My attention has been drawn repeatedly of late by laboratory workers (and rightly so) to the frequency of staphylococcal infection of the anterior nares; but I suspect that some remain unaware of the fact that the clinical rhinologist is fully alive to the condition.

This "staphylococcal nasal vestibulitis," as I call it, has fairly typical clinical aspects. There is a recurring crusty dermatitis of the skin of the nasal vestibule and a tendency to the formation of small painful cracks and fissures; the patient is often compelled to finger the nose to clear obstructive dried secretion. The end of the nose may be red, and the condition is often aggravated by exposure to cold wind, which lowers the local resistance and vitality by chilling. In some cases there is the added affliction of boils or furuncles (involvement of hair follicles), and on occasion these may assume alarming features with visions of cavernous-sinus inflammation. In others, the infection tends to spread a little into the nasal passage itself, causing congestion, swelling, and a sticky serous catarrh of the mucous membrane; and from there the lesion may pass up the tear duct and cause dacryocystitis, conjunctivitis, and blepharitis.

Some patients present a definite slight œdema of the cheek, which represents a "lymphangitis," with tenderness of the submaxillary group of lymph-glands, all secondary to the staphylococcal dermatitis of the nasal vestibule; and in this connexion it is interesting to conjecture the relation to erysipelas. I personally am inclined to believe that erysipelas may prove to be nothing more than a severe type of this facial lymphangitis, and that if a careful search is made a small infected crack or fissure will often be discovered in the nasal vestibule as the "primary focus."

Certain of the difficulties experienced by the Birmingham workers[1] seem reasonably explained on clinical grounds. For instance, the back of the wrist is a refuge for staphylococci because in some sections of society this portion of anatomy often plays substitute for the handkerchief and escapes attention in washing the hands. Clinical experience shows that penicillin ointment is not of much greater value than other antiseptics in the treatment of chronic staphylococcal skin infections, and this is probably because of failure of access of the medicament to the organisms, which remain sheltered in the hair follicles and among the layers of the cornified epithelium; and this applies equally when penicillin is used parenterally.

Of many medicaments tried, I have found 'Ung. Quinolor Co.' (Squibb) to be quite effective, but it must be emphasised that the nose should be kept greased with this preparation for at least 2 or 3 months. It may be that duration of treatment is of greater importance than the nature of the medicament.

Liverpool. JOHN ROBERTS.

A QUOTATION

SIR,—Can you, or one of your scholarly readers, tell me the name of the author and the reference of the following quotation, which says that the doctor's task is *Guérir quelquefois, soulager souvent, consoler toujours?*

D. P. LAMBERT.

PRIMARY MENINGOCOCCAL CONJUNCTIVITIS

SIR,—The article by Dr. Stuart and Dr. McWalter on Feb. 14 recalls to mind a case of primary meningococcal conjunctivitis that eventually developed into an acute meningococcal septicæmia. The victim was a sister in charge of several cases of acute cerebrospinal meningitis during the 1940–41 outbreak. Among these was a semi-comatose patient who during the acute phase of his illness persistently spat every few minutes.

One evening it was noted that the sister had conjunctivitis; this aroused a suspicion of measles, despite a previous history of this infection, but repeated examinations revealed no Koplik spots. On the third day she took to her bed feeling out of sorts, and on examination minute petechial spots were found on her neck and chest. Lumbar puncture was carried out. The cerebrospinal fluid (C.S.F.) was clear and not under pressure, but nevertheless treatment was immediately inaugurated. Within 12 hours the patient was comatose and there was a widespread purpuric rash. She eventually recovered, but not before she developed acute bilateral iritis and several other complications. On culture one meningococcal colony was obtained from the C.S.F. Here one feels confident in assuming that primary infection was through the conjunctiva.

During the same outbreak there was a second case, which suggested the possibility of the lungs being a portal of entrance for meningococcal infection.

Seven Newfoundland "lumberjacks" were admitted with a history of "flu." Their symptoms consisted of general malaise, slight sore throat, and pyrexia. They were treated as suffering from a simple febrile condition, and in six of the patients the temperature settled in a few days; in the seventh it did not do so, and he developed cough and sputum. Examination of his chest revealed a widespread catarrhal condition. Investigation of the sputum showed massive clumps of gram-negative diplococci, and these were proved by Dr. H. J. R. Kirkpatrick, of the Royal Northern Infirmary, Inverness, to be group-1 meningococci. The patient rapidly recovered with sulphonamide treatment. Lumbar puncture was not carried out, and he did not exhibit any signs of meningitis; but it is reasonable to conclude that if untreated he might have done so. As all seven patients were in the same hut, it is probable that the febrile condition of the other six was also of meningococcal origin.

County Hospital, Invergordon, Ross-shire. J. LANDESS HORNE.

4. Lewis, T. Pain. London, 1942.

1. Moss, B., Squire, J. R., Topley, E., Johnston, C. M. *Lancet*, Feb. 28, p. 320.

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HEALTH EXAMINATIONS

SIR,—I have studied with interest the views expressed in your columns on the subject of health examinations, and I am sorry that space seems to have prevented the presentation of any factual evidence of their value. I am particularly struck with Dr. Watson's (Jan. 17) statement that no doctor would pretend either to his patient or himself that by clinical examination alone he could be certain of excluding lung disease; this very thing was pretended to the majority of recruits to the Armed Forces, and it is the air of pretence about the whole matter that is making the more discerning layman sceptical of its value. I used often to find myself in the same position as Professor Aitken (Jan. 24) when he relies upon the youth of the examinee rather than the examination itself in excluding serious disease; but young men do have peptic ulcers.

In diagnosis we judge our methods by the frequency of missed cases on the one hand and false positives on the other; and we are surrounded by examples of techniques that have failed in this respect and have been discarded. It would be a pity to preserve them as biological exercises (vide Dr. Lloyd Davies, Jan. 24), even though some provided quick, and even intimate, introductions to the patient (vide Professor Aitken). Into this category fell my routine examinations.

I have one last request: that Dr. Parnell shall tell us whether his patient with polyarthritis was cured by treatment of the routinely discovered nasal polypi.

Cheam, Surrey. C. P. PETCH.

TUBERCULOUS CERVICAL ADENITIS

SIR,—It is noteworthy that Mr. Hamilton Bailey omits the most important form of treatment for enlarged inflamed glands in the neck—whether of streptococcal or tuberculous origin—and that is *rest*. What would we say of a survey of the treatment of a tuberculous knee or hip, if in it were discussed excision of the joint and curettage of sinuses, and fixation of the joint were not mentioned; for today fixation has ousted the others. So should it be with glands. Though I had been taught it before, it was Mr. Wilfred Trotter who fixed this in my mind on a day when he came round my ward and criticised me severely, in his kindly way, because I had in one of my beds a child with enlarged inflamed glands in the neck for whom I had taken no action to immobilise the head. He stated that unless you did so it was useless to put the patient to bed; and then he gave a clue to the reason by the simple anatomical explanation that in the neck there are the only masses of glands that are habitually enlarged and are placed between two groups of muscles. Other glands—in the groin, abdomen, chest, and axilla—have muscles on one side and on the other pliable soft connective tissue which gives when they move; but in the neck with every movement the glands are squeezed between the sternomastoid on one side and the prevertebral muscles on the other. Once you have grasped that fact you begin to study the wondrous mobility of the neck. It is not a question of the three primary planes of the body but of any plane at any angle to one, two, or even all three of these; and no-one can keep his head still. The movements of the neck take a large part in the physiology of attention. The beginning of the movement is reflex; after it has begun, its continuance is under the will—as is also its inhibition, if the patient thinks of it; but by that time the glands between the sternomastoid and the spinal column have been squeezed. Fix the neck and the glands will get well; but the fixation must be complete, and for that a plaster that involves the forehead and comes down to the line of the nipples is alone efficient. Any other may limit the movements but dose not fix the neck. If this were done for all cases of enlarged glands in the neck, without trying to determine whether they are streptococcal or tuberculous, the four stages that Mr. Hamilton Bailey recounts would not occur. They should today be as unknown as are the similar processes in joints which have broken down, with pus oozing out of sinuses.

Far be it from me to say that any statement of mine is "undoubted" or "undeniable," but I cannot accept Mr. Hamilton Bailey's use of these terms as evidence, any more than I can accept an experiment which imitates in the pig the Lübeck incident. Too much has been made of this, in that the infection was far heavier than happens in clinical medicine. Let us remember that this was not clinical medicine: it was a ghastly tragedy. Brushing tubercle bacilli upon the fauces of healthy animals is to imitate the tragedy not the usual.

But there is another hypothesis which seems to me to be much more likely to be true in the vast majority of cases. It is that damage is done to the glands by the streptococcus absorbed from any part of the surface tissue of the pharynx, including the teeth, and not only from the mucous membrane which covers the subepithelial lymphatic glands. That these streptococci are killed out, and then a wandering tubercle bacillus settles in the damaged tissue. Mr. R. Davies-Colley has for many years thought that this was the explanation in most cases, and it fits in with the teaching of Sir Harold Stiles that these were bovine tuberculosis, infected from the mouth by way of the intestine. It was on his work in seeking out the byres from which came the milk his patients were drinking that Sir Robert Philip based his plea for refraining from operation.

I would sum up the treatment thus:

1. At the first possible moment, as a matter of urgency, put every case of enlarged glands in the neck into a plaster from the forehead to the nipple line.
2. If the enlargement of the glands coincided with an attack of acute follicular tonsillitis, and this was the third attack within the last twelvemonth, take out the tonsils six weeks after the glands have subsided.
3. If at that time the lymphoid tissue of the nasopharynx is so much that it obstructs breathing, remove enough to give an airway and no more.
4. If the onset did not coincide with an acute infection, do such skin and other tests as may help in determining whether the patient is affected by the tubercle bacillus.
5. Trace out the milk-supply and have it tested.
6. Get the patient up and out of doors and active as soon as possible.
7. Keep on the plaster too long rather than too short a time.

If Mr. Hamilton Bailey, after this, sticks to his present hypothesis, it is up to him to demonstrate the tubercle bacillus in, at any rate, a majority of the specimens of tonsils and adenoids that he removes.

Finally, to quote papers ranging from 1903 to 1917 in favour of operative interference is no argument for using it now.

London, W.1. T. B. LAYTON.

PLANTAR WARTS

SIR,—Mr. McLaughlin's article has ominous implications. He expresses the hope that radiological treatment will be suppressed by successful litigation. As I understand the law, a claim for damages can succeed only if negligence or lack of skill be proved. While no-one would wish these faults to escape their due penalty it can hardly be said that radiologists are guilty of either of them.

Mr. McLaughlin is of course perfectly at liberty (indeed it is his duty) to demonstrate the superiority of his own method through the proper medium of publication, though in fact the popularity of radiology is due to the repeated failure of methods such as he describes, as every radiologist knows. Moreover, the subsequent correspondence has demonstrated the wide diversity of opinion on the treatment of this apparently simple complaint.

The history of medicine is full of untoward results of all kinds of treatment of all manner of diseases. One rarely opens a medical journal today without reading of the evil consequences, often fatal, of new methods. The radiologist is in the unfortunate position that ill effects are not manifest until considerable time has elapsed, but they are only very rarely fatal. Fatalities in the operating-theatre, on the other hand, are by no means uncommon and are covered by a jury's verdict of death by misadventure. But who is to say how often death might have been averted by a little more care or by slightly better judgment?

When Mr. McLaughlin wishes to suppress a method by a process involving heavy damages with all the

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attendant publicity, and when by implication he would be willing to take part in such process, he introduces a concept of medical ethics which is quite new. We all make mistakes. Let Mr. McLaughlin remember that nobody is in a better position to see the results of surgical misjudgment than the radiologist. CAVEAT.

NURSES' HOMES

SIR,—Several correspondents have described the modern steel-and-concrete and highly efficient nurses' homes, in which it is so difficult to feel "at home."

Would it not be a good policy, in any school of sufficient size, to divide the nurses' accommodation into so many houses, as in the public schools? These could be made attractive and homely, especially if built round courtyards in warm-coloured materials. I think in this way nurses' lives could be made more pleasant, and in after years they could say, "I was in the . . . house at . . . hospital." This system would provide a convenient division for social activities and competitive games, as in other schools.

It is difficult, in this age of large groupings, to feel much affection for a county or regional organisation. Most of us find it less difficult to attach our affections to smaller units. I suggest that this change in design would permit local loyalties to be strengthened, whereby would come greater contentment.

Barnet. G. C. PETHER.

Parliament

FROM THE PRESS GALLERY

The Ineducable Child

AT the second reading of the Education (Miscellaneous Provisions) Bill in the House of Commons on Feb. 27, Mr. G. TOMLINSON, the Minister of Education, said that under the existing law once a child had been declared ineducable it remained so for the rest of its life, even though the authority had been misinformed, or the child improved and later became educable.[1] Clause 8 of the new bill gave authorities power to revise their report. Mr. Tomlinson admitted that he had gone outside the law in an attempt to help these children, but he was sure everyone would welcome the adjustment.

Causes of Divorce

In the House of Lords on Feb. 26 Lord MESTON asked the Government to consider amending the Matrimonial Causes Act, 1937, so as to provide that a marriage might be voidable where one of the parties to a marriage at all times refused to allow the procreation of children by insisting on the use of methods of prevention. He said that if a discussion was entered on what did or did not constitute consummation of marriage they would soon find themselves in a state of chaos. He therefore suggested that they should try and avoid any such discussion and create an entirely new statutory ground of nullity.

Viscount JOWITT, the Lord Chancellor, replied that the Government did not consider that it would be right to add to the grounds for voiding a marriage as Lord Meston suggested, and they had no intention of bringing in legislation to amend the Matrimonial Causes Act, 1937, for that purpose.

QUESTION TIME

Social Insurance Within the Empire

Mr. J. E. HAIRE asked the Minister of National Insurance what plans he had for the integration of social-insurance schemes within the Commonwealth; and if he would state his policy.—Mr. J. GRIFFITHS replied: It is the policy of H.M. Government to endeavour to conclude reciprocal arrangements, wherever a satisfactory basis can be found, between the social-insurance schemes of this country and other Commonwealth countries. A conference of officials of the governments concerned, including Eire, was held in London last May to consider the principles governing such reciprocity. Their report, which was unanimous, is now before the respective governments. Their recommendations, if accepted, will provide a basis for negotiations designed to establish specific and detailed reciprocal arrangements with particular Commonwealth countries.

1. See *Lancet*, 1947, ii, 220, 224.

Nurses Working Party—Minority Report

Mr. S. HASTINGS asked the Minister of Health whether the attempt to produce a minority report by the members of the Working Party on the Recruitment and Training of Nurses had been abandoned, or when he expected to receive this report.—Mr. J. EDWARDS replied: I understand that the member of the Working Party who felt unable to sign the majority report intends to submit a minority report by the end of April.

Remuneration of Pension Specialists

Sir E. GRAHAM-LITTLE asked the Minister of Pensions if he was aware that the rates of remuneration of the specialist medical officers employed by his department were much below those fixed by the B.M.A. as a minimum and accepted by most hospitals and whether he would raise these rates.—Mr. G. BUCHANAN replied: The rates of remuneration of specialists employed by my department on a part-time basis for hospital work are in general accord with the rates agreed by the B.M.A. with appropriate authorities. The rates payable to specialists and consultants for sessional medical board work are at present the subject of discussion between my department and the B.M.A.

Alien Doctors

Mr. W. L. WYATT asked the Minister whether the necessary printed forms were now available to alien doctors so that they could make applications to come on the Medical Register; and whether he was aware that great hardship had been caused by the failure of his Ministry to approve these forms hitherto.—Mr. A. BEVAN replied: This is a matter for the General Medical Council who I understand have already issued some of these forms and expect to issue the remainder shortly.

Grants to Hospitals

Replying to a question, Mr. BEVAN stated that 189 hospitals in England and Wales had received grants to enable them to maintain proper services pending the establishment of a National Health Service.

Universities Grants

Sir E. GRAHAM-LITTLE asked the Chancellor of the Exchequer if he would make a statement regarding the grant to universities which he proposed to make in the forthcoming budget.—Sir S. CRIPPS replied: Provision will be made for recurrent grants to universities for general purposes and for medical and dental education on the scales announced by my predecessor in his statement of March 10, 1947. Since that date, responsibility for aiding agricultural and veterinary education has been assumed by the Treasury, and I shall ask Parliament to provide £232,500 for these purposes. After the present academic year the teaching hospitals will be financed under the National Health Service Act, and the need for Treasury grants to them will cease. Provision for such grants can, therefore, be reduced to £250,000. As regards non-recurrent grants, experience has shown that the rate of expenditure on capital developments was somewhat overestimated last year and I propose this year to provide £2 million for this purpose. Accordingly, the total amount which Parliament will be asked to vote for 1947–48 is £11,880,000.

Service Medical Records

Major E. A. H. LEGGE-BOURKE asked the Minister of Defence why the Service medical history of a demobilised man cannot at his request be made available for life-assurance purposes.—Mr. A. V. ALEXANDER replied: The point is one of some difficulty. I am considering it with the Service Ministers.—Major LEGGE-BOURKE: Will the Minister bear in mind while he is considering this matter that it may be desirable for soldiers who find it impossible to get life assurances unless they have their medical records to be allowed to get them in special cases?—Mr. ALEXANDER: It is quite a new principle in medical examination for insurance for a client to be told that he cannot be insured unless he produces his Army record. It is the responsibility of the insurance companies to obtain their own medical officers and to take their own risks.—Major LEGGE-BOURKE: Does not the Minister realise that it is sometimes essential, in order to establish whether a certain disability has a certain cause behind it, to get hold of the records made at the time of the original injury or illness?—Mr. ALEXANDER: We shall always do our best not to do any injury to an ex-Serviceman. It is fundamental that we should not interfere with the general

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practice that applies to general cases of insurance for the civil population and which has been a long-established practice in all industrial organisations.

Children's Milk Allowances

Mr. H. W. BOWDEN asked the Minister of Food why 12 pints of milk per week might be obtained on a child's ration book when the child was being fed on patent food and was under 12 months old, but a child wholly fed on National Dried Milk did not receive an allowance of milk; and if he would agree to make an allowance in the latter case?—Mr. J. STRACHEY replied: National Dried Milk is issued at a reduced price or free as an alternative to liquid milk under the national scheme of family allowances. Proprietary infant food is not a family allowance in kind and is normally paid for at the full retail price, so the priority milk is not withdrawn. I am considering whether any change in these arrangements is desirable.

Tuberculosis in Schools

Mr. A. GREENWOOD asked the Minister of Education what steps were taken by his department to detect the existence of tuberculosis among teachers and pupils.—Mr. G. TOMLINSON replied: The arrangement of the School Health Service for routine and special medical inspections is directed to the discovery of the onset of diseases, including tuberculosis. In all cases of suspicion children are referred to the tuberculosis officer of the council. All intending teachers must take an initial medical examination. In addition, under standing instructions published in 1926 jointly by the Ministry of Health and my department, a teacher found to be suffering from active tuberculosis shall be suspended from teaching. I propose to remind authorities of this requirement.

Mr. GREENWOOD: Has the Minister considered a recent speech by Dr. Norman Tattersall and will he consider making it compulsory for all teachers to have a regular medical overhaul to ensure that they are not carriers of tuberculosis capable of infecting the children in our schools?—Mr. TOMLINSON: I will look into it. Mr. SOMERVILLE HASTINGS: Would it be possible to arrange for all teachers to have an examination of their chests by mass radiography once in 5 or 10 years?—Mr. TOMLINSON: I will consider the possibility of discussing that with the Minister of Health and the local education authorities.

Births, Marriages, and Deaths

BIRTHS

ANDREWS.—On Feb. 24, the wife of Dr. Gordon Andrews—a daughter.
ARMIN.—On Feb. 29, at Bath, to Dr. Margaret Armin, wife of Dr. Richard Armin—a daughter.
BARWELL.—On Feb. 25, at St. Ives, Cornwall, the wife of Dr. T. E. Barwell—a son.
CRICHTON.—On Feb. 20, at Winchester, the wife of Squadron-Leader David Crichton, M.B.E., R.A.F.—a daughter.
ELDER.—On Feb. 26, at Much Hadham, Herts, the wife of Dr. Peter Elder—a daughter.
GILBERT.—On Feb. 23, at Bembridge, I.O.W., the wife of Dr. James Gilbert—a daughter.
JENKINSON.—On Feb. 23, in London, the wife of Dr. R. C. Jenkinson—a son.
JONES.—On Feb. 22, in London, the wife of Dr. E. E. Jones—a daughter.
KINGSTON.—On Feb. 21, the wife of Dr. John Kingston—a son.
MILTON.—On Feb. 24, the wife of Dr. D. I. C. Milton—a daughter.
MONTGOMERY.—On Feb. 25, at Larkfield, Kent, the wife of Dr. A. P. D. Montgomery—a son.
MORGAN.—On Feb. 11, in London, to Dr. Elizabeth Tylden, wife of Dr. G. D. Morgan—a son.
NEWMAN.—On Feb. 24, in London, the wife of Mr. Philip Newman, F.R.C.S.—a daughter.
PAUL.—On Feb. 21, at Chester, the wife of Dr. Michael Paul—a son.
POSFORD.—On Feb. 26, at Croydon, the wife of Dr. Peter Posford—a son.
SWEET.—On Feb. 20, at Caterham, the wife of Dr. R. D. Sweet—a son.
VELLACOTT.—On Feb. 11, at Oxford, the wife of Dr. William Vellacott—a son.
WOODGATE-JONES.—On Feb. 25, at Bishop's Lydeard, Somerset, the wife of Dr. N. P. Woodgate-Jones—a daughter.

MARRIAGES

CLARKE—WIDDAS.—On Feb. 12, at Mollens, Switzerland, P. S. Clarke, L.M.S.S.A., to Madeleine Widdas.
THOMPSON—SOUTHWOOD.—On Feb. 21, at Wimbledon, Peter Horrocks Thompson, M.B., to Betty Southwood, S.R.N.

DEATHS

BADENOCH.—On Feb. 22, at Wanstead, William Minty Badenoch, M.B. Aberd.
CLARKE.—On Feb. 24, at Hove, Joseph John Clarke, L.R.C.P.I., aged 86.
DURRAN.—On Feb. 22, in Edinburgh, Donald Edward Durran, M.B. Edin.

Notes and News

THE B.M.A.'S CAMBRIDGE MEETING

THE supplement to last week's *British Medical Journal* contains a provisional programme for the 116th annual meeting of the British Medical Association to be held at Cambridge from June 25 to July 2 under the presidency of Sir Lionel Whitby, regius professor of physic in the university. The annual representative meeting will take place on June 25 and the three succeeding weekdays. The clinical and scientific work will be divided among 19 sections, meeting on June 30 and July 1 and 2. The names of these sections and their presidents are: medicine (Dr. L. B. Cole), surgery (Mr. Vernon Pennell), and obstetrics and gynæcology (Mr. J. R. Campbell Canney), each meeting for three days; anæsthetics (Dr. Z. Mennell), child health (Sir Leonard Parsons), diseases of the chest (Dr. R. R. Trail), occupational health (Dr. Donald Stewart), ophthalmology (Mr. O. Gayer Morgan), orthopædics (Prof. T. P. McMurray), pathology and bacteriology (Prof. H. R. Dean), physiology including biochemistry (Prof. A. C. Chibnall, F.R.S.), preventive medicine (Dr. G. F. Buchan), and radiology (Dr. S. Cochrane Shanks), each meeting for two days; and anatomy and anthropology (Prof. H. A. Harris), dermatology (Dr. C. H. Whittle), neurology and psychiatry (Prof. E. D. Adrian, O.M.), nutrition (Prof. R. A. McCance), otorhinolaryngology (Mr. V. E. Negus), and pharmacology (Prof. E. B. Verney, F.R.S.), each meeting for one day. Apart from private hospitality, accommodation for visitors will be confined to colleges and lodgings.

MATRICIDE

IT occasionally happens that a man pursues a case-history which in turn becomes a statement of disease entity; the statement reaches to the well-springs of human action and lifts the work out of its specialty in to the universal. Such a book is *Dark Legend*.[1] Half of it is a life-story, told simply and honestly by an adolescent matricide. The second half is the no less skilled interpretation by Dr. Wertham, whose sympathy for the boy evoked the final confidence. Dr. Wertham links the myths of Orestes and of Hamlet with the fantasy in which the boy was living, and shows their essential unity.

Matricide, a rare crime, is nearly always the work of an adolescent (though Hamlet was thirty). Commonly the father has died and the mother taken a new lover. The boy consciously believes he is avenging his father's honour, and is unaware of the emotions in himself this rationalisation conceals. In the case of the boy in this book, the act was followed by a sense of relief, of buoyancy untempered by guilt. Later, after he had been under treatment for some time, he was able to regret the deed; and in a third phase—which Dr. Wertham believes to be the stage of recovery—he was able to put the whole disaster behind him, and was ready, had he had the chance, to adjust himself to normal adult life. Since he was detained in a criminal asylum this, of course, was not possible. Dr. Wertham describes the case as one of catathymic crisis, a term which he originated and has used before for cases of this type.

His study of *Hamlet*—particularly the quotations he gives from the first and second quartos—is curious and instructive. He sees the play, not as a revenge story, but as a study of the emotions of a matricide, emotions kept in check by other factors in Hamlet's character. The second quarto shows a change of emphasis which indicates, he thinks, a growing recognition in the mind of Shakespeare of Hamlet's relations with his mother, and all that they implied. It is worth comparing this interpretation of the play with the psychoanalytic study of Hamlet by Dr. Ernest Jones recently published[2] by the Vision Press as a preface to their edition of Hamlet. The two readings are not contradictory: indeed they overlap. Dr. Jones explains the paralysing inertia which kept Hamlet from avenging his father in terms of the Œdipus situation: Claudius—himself a father figure—had fulfilled the two infantile wishes which Freud thought to be universal—the wish to kill the father and to mate with the mother. Hence Claudius's guilt was Hamlet's guilt, and he could not kill the wicked uncle without sharing his punishment. From the moment when he fails to slay the King at his prayers, Hamlet's whole course is unconsciously to

1. London: Gollancz. 1947. Pp. 119. 6s.
2. Hamlet, by William Shakespeare, with a Psycho-analytic Study by ERNEST JONES, M.D. London: Vision Press. 1947. Pp. 180. 8s. 6d.

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direct events towards his own death and expiation: he is unable to kill his uncle until he has himself received his death wound and has seen his mother die. The essay is an abridgment of Dr. Jones's previous study of Hamlet.

ROUND THE "UNITED"

THE idea of grouping several hospitals in a region to provide a complete training school for nurses has much to recommend it, and a practical experiment in this type of training is already being conducted by the Royal Liverpool United Hospital. In 1938 four Liverpool hospitals decided to combine: the Liverpool Royal Infirmary, the David Lewis Northern Hospital, the Royal Southern, and the Liverpool Stanley Hospital. They are the four general hospitals which give training to the greater part of the medical students who qualify in Liverpool University, and between them have nearly 1000 beds. All four hospitals are recognised training schools for nurses; but nurses accepted for training become nurses of "the hospital," and not of any constituent branch. Normally, however, a nurse begins training in the branch hospital of her choice, but the hospital retains the right to move her from one branch to another during training, or to send her, by arrangement, to take part of her training in other hospitals where special experience is to be had.

The conditions of service are well set out in a prospectus,[1] to which considerable thought has evidently been given. Opportunities for the qualified nurse are explained and conditions of acceptance given. Nursing discipline is described sensibly, as being necessary in the wards; but the paragraph goes on: "When a nurse is not on duty, however, she is an individual in her own right, and should not be subject to the same degree of discipline. That is the ideal which the United Hospital is attempting to achieve." This, without making too many fair promises, shows a modern approach to methods of running the nurses' home; and the same enlightened spirit appears again where the prospectus notes that qualified nurses may, if they wish, live outside the hospital in their own rooms. A copy of the agreement form appears on the last page; and though this loses some of its terrors from the preceding pages of explanation, it is perhaps worth considering whether such agreements, binding a young girl to "serve the hospital as a student nurse for four years," are not among the causes of our present nursing shortage. It is difficult to couple student status with a legal obligation to "serve" a hospital.

SHELLEY'S NEUROSIS

NOT long ago Mr. Harold Nicolson [2] encouraged us to hope that Shelley—along with many other writers and poets—was a good deal fitter than we had sentimentally supposed. Dr. H. St. H. Vertue [3] now suggests that Shelley's disorder—if any—was emotional, deriving from his devotion to his mother. The poet, he thinks, expressed an almost feminine appreciation of the function of maternity in the lines:

> "The starlight smile of children, the sweet looks of women, the fair breast from which I fed. . . ."

To many women, however, these lines appear peculiarly masculine and romantic—though coming, perhaps, oddly from a man so closely embroiled with family life as Shelley. It is true, as Dr. Vertue shows, that Shelley often wrote of "the supreme beauty and goodness of women," but, as so often happens when the mind treasures a powerful emotional fantasy of this kind, he seems to have little real appreciation of women's needs or dues. For him they must keep their pedestals as mother figures; and with the exception of Harriet, who was a child herself, he seems to have been fortunate in finding women who submitted to this exacting deification. "The women of Shelley's household," as Dr. Vertue puts it, "must have handled him with tact and good sense. He suffered no arrest nor deviation in development. . . ." That experience, apparently, was left for them, and was perhaps bought with the outlay of something more than tact and good sense. Yet is it true that Shelley suffered no arrest? Do not these very lines, and many others in his work, suggest his halt at the fair breast from which he fed? Dr. Vertue surely admits as much when he says that, at the time of meeting Jane Williams (who sang charmingly, played the guitar, and was a capable mesmerist), the poet had "regressed in his idea far towards the maternal image." Jane urged him, hypnotised, to "sleep with the slumber of the dead and the unborn."

That Shelley appreciated the deep confusion of his own emotions can hardly be doubted. His mind was shaped to feel deeply and sensitively, but not to see its own remedies—for which his admirers must remain jealously glad.

EXERCISES FOR MOTHERS

THE National Baby Welfare Council have published a leaflet illustrating simple but sound antenatal and postnatal exercises for mothers. The leaflets, which cost only 1*d.* each, may be obtained from the council at 29, Gordon Square, London, W.C.1.

University of London

Mr. Eric Boyland, D.SC., has been appointed to the university chair of biochemistry tenable at the Royal Cancer Hospital (Free).

University of Manchester

The following appointments are announced: Dr. A. A. Harper, reader in human physiology; Dr. John Wainwright, lecturer in pathology; Dr. E. P. Samuel, assistant lecturer in anatomy; Dr. John Ball, assistant lecturer in pathology; Dr. D. R. Goodfellow, lecturer in medical ethics and conditions of medical practice; Dr. Winifred Burbury, honorary clinical lecturer in child psychiatry; Dr. R. I. Mackay, clinical tutor in child health; Dr. J. K. Wright, surgical tutor in orthopædic surgery.

Association of Surgeons of Great Britain and Ireland

The annual meeting of the association is to be held in Edinburgh on Thursday, Friday, and Saturday, May 6, 7, and 8, instead of in July as planned. The provisional programme includes discussions on Maintenance of Metabolism by Parenteral Methods, Diaphragmatic Hernia, Hypertension, and the Surgery of Pancreatic and Ampullary Neoplasms. The president is Prof. J. R. Learmonth.

Leeds Postgraduate Course

The University of Leeds is holding a fortnight's refresher course for general practitioners, beginning on Monday, May 24. Further particulars will be found in our advertisement columns.

Crichton Royal, Dumfries

Fellowships in psychiatry at this hospital for the year beginning on April 1, 1948, have been awarded to Dr. A. D. Weatherhead, Dr. H. R. Hanna, and Dr. S. D. McGrath.

New Zealand Fellowships

The Nuffield Foundation is offering annually for the next 7 years two fellowships in medicine to men or women who belong to New Zealand or who hold a New Zealand medical qualification. Further information will be found in our advertisement columns.

Pharmaceutical Society of Great Britain

On Thursday, March 11, at 7.30 P.M., at 17, Bloomsbury Square, London, W.C.1, Sir Weldon Dalrymple-Champneys, deputy chief medical officer of the Ministry of Health, will speak on the work of the medical staff of the Ministry.

Anglo-Austrian Society

On Thursday, March 11, at 6.30 P.M., at 6, Hanover Street, London, W.1, Prof. J. R. Marrack will speak on the World Food Situation.

Scholarships at Foreign Universities

The British Council has been informed that scholarships for the academic year 1948–49 will be offered to students and graduates of British universities and colleges by the University of Teheran and by a number of foreign countries, including Belgium, Hungary, the Netherlands, and Sweden. These scholarships are normally intended for study on post-graduate level. Two scholarships have also been offered by the University of Cologne, and two by the University of Münster. For the present academic year similar scholarships were offered by the governments of Czechoslovakia, Finland, and Norway; and probably some or all of these offers will be repeated. Further information may be obtained from the Controller of the Education Division, the British Council, 3, Hanover Street, London, W.1.

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1. The Royal Liverpool United Hospital: Training School for Nurses. Issued by the Hospital at 80, Rodney Street, Liverpool, 1.
2. *Lancet*, 1947, ii, 709.
3. The Tragedy of Shelley. Reprinted from *Guy's Hospital Reports*, 1946, 95, 53.

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New U.S. Surgeon-General Nominated

Dr. Thomas Parran, whose term as surgeon-general of the U.S. Public Health Service ends on April 6, is to be succeeded by Dr. Leonard A. Scheele, the present assistant surgeon-general.

Rockefeller Foundation Grant for Psychiatric Research

A donation of £9000 has been made by the Rockefeller Foundation "for research in normal and pathological biochemistry of brain tissue under the direction of Dr. Derek Richter" at the Neuropsychiatric Research Centre, Whitchurch Hospital, Cardiff.

B.M.A.'s Second Libel Action

The British Medical Association have issued writs for alleged libel against Dr. S. W. Jeger, Mr. Somerville Hastings, Dr. L. Comyns, and Dr. H. W. B. Morgan in respect of a letter signed by them which appeared in several newspapers.

More Doctors Needed in U.S.A.

Establishment of government-financed scholarships for the training of young doctors, dentists, nurses, and public-health personnel is urged by Mr. Oscar Ewing, head of the U.S. Federal Security Administration. He is reported by B.U.P. as estimating that by 1960 there will be from 15,000 to 30,000 less than the required number of doctors.

Diets for the Sick

A joint meeting of the nutrition panel of the Society of Chemical Industry and the British Dietetic Association will be held on Wednesday, March 24, at 6 P.M., in the rooms of the Chemical Society, Burlington House, Piccadilly, London, W.1, when Dr. D. P. Cuthbertson and Miss R. M. Simmonds, S.R.N., will speak on Special Dietary Requirements in Sickness and Convalescence.

Royal Microscopical Society

At a meeting to be held on Wednesday, March 17, at 5.30 P.M., at B.M.A. House, Tavistock Square, London, W.C.1, Mr. J. E. Barnard, F.R.S., will be admitted to the honorary fellowship. Afterwards Mr. R. J. Ludford, D.SC., will speak on the Application of the Barnard Ultraviolet Light Technique for the Study of Living Cells, and Mr. J. Smiles, A.R.C.S., on New Development in Visual Light Microscopy.

Medical Books for War-devastated Countries

Nearly a thousand volumes of medical books and periodicals have been distributed through UNESCO during the past two months to libraries in eight war-devastated countries. An agreement has been reached between UNESCO and the American Medical Library Association by which duplicate books and periodicals of American medical libraries will be placed at the disposal of medical libraries in other countries.

National Association for the Prevention of Tuberculosis

The inaugural meeting of the medico-social section of the association will be held on Friday, May 7, at 5 P.M., at B.M.A. House, Tavistock Square, London, W.C.1, when Sir Robert Young will preside. Mr. Anthony Greenwood, M.P., will speak on Social Aspects of Tuberculosis.

A prize of 100 guineas will be awarded in 1949 by the council of the association for an essay on the control of tuberculosis in a British colony.

The competition is open to doctors in the British Colonial Medical Service of not more than ten or less than five years' medical standing, of which at least three have been spent overseas. Further information may be had from Dr. Harley Williams, N.A.P.T., Tavistock House North, Tavistock Square, W.C.1.

Royal Air Force

Air Vice-Marshal P. C. Livingston has been appointed director-general of R.A.F. medical services in succession to Air Marshal Sir Andrew Grant.

Air Vice-Marshal Livingston was born in Vancouver Island in 1893 and was educated in Canada and at Jesus College, Cambridge, where he rowed for the university in 1914. Qualifying from the London Hospital in 1919, he took the D.P.H. in 1920, the D.O.M.S. in 1923, and the F.R.C.S.E. two years later. After holding house-appointments at the London, he joined the R.A.F. in the medical branch, later becoming a consultant in ophthalmology. He qualified as a pilot in 1931. His published work includes papers on ocular disturbances related to malnutrition and visual problems associated with flight and with aerial warfare. He is also the author of the aviation section of *Modern Trends in Ophthalmology*. In 1946 he went to South-east Asia as principal medical officer of Air Command, Far East, returning to England last September as deputy director-general. He received the Air Force Cross in 1943, and was appointed C.B.E. in 1946 and C.B. in 1948. In 1942 he was elected F.R.C.S.

Chemical Exhibition in Belgium

The first international exhibition of pure and applied chemistry is to be held at Charleroi, Belgium, on Sept. 4–20. One day is to be devoted to conferences on pharmaceutical chemistry.

Royal Statistical Society

The council of the society offer the Frances Wood memorial prize, value £30, for competition in 1948.

The prize is offered for the best investigation, on statistical lines, of any problem bearing directly or indirectly upon the economic or social conditions of the people. Essays must be sent, not later than Dec. 31, to the hon. secretaries of the society, 4, Portugal Street, London, W.C.2, from whom further particulars may be had.

After his visit to Chile as a delegate of the Royal Society to the Chemistry Congress, Prof. E. C. Dodds, F.R.S., will lecture at Buenos Aires for the British Council. He is speaking on Synthetic Œstrogens in Medicine and Biology.

CORRIGENDUM.—In our annotation last week on Œdemas and Anæmias of Malnutrition (p. 333), the number of subjects in Germany on which Dr. Sinclair's analysis was based should read, "over 10,000."

Appointments

ALDRIDGE, A. G. V., M.A., M.D. Camb., M.R.C.P.: **visiting consultant** pædiatrician to the Worcestershire hospitals.
MADDEN, E. B. P., M.R.C.S., D.M.R.E.: **radiologist, Hampstead** General and North-West London Hospital.
ROLLIN, H. R., M.B. Leeds, D.P.M.: **asst. physician, Horton Hos**pital, Epsom.
THOMPSON, J. D., B.A., M.B. Dubl.: **director of department of** physical medicine, Redhill County Hospital, Edgware.
THORLEY, A. S., M.D. Lond., D.P.M.: **asst. physician, Sutton Emer**gency Hospital, Sutton, Surrey.

Diary of the Week

MARCH 7 TO 13

Monday, 8th

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1
5 P.M. Dr. P. M. F. Bishop: Hormones in Medical Practice. (Second lecture.)
ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5 P.M. Dr. L. W. Proger: Giant Cells. (Second of two Erasmus Wilson demonstrations.)
MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
8.30 P.M. Dr. C. H. Andrewes, F.R.S., Dr. C. H. Stuart-Harris, Dr. Freddy Himmelweit: Ætiology of the Common Cold and Influenza.

Tuesday, 9th

ROYAL COLLEGE OF PHYSICIANS
5 P.M. Dr. J. F. Wilkinson: Concerning Megalocytic Anæmias. (First Oliver-Sharpey lecture.)
INSTITUTE OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. R. T. Brain: Physio- and Electro-therapy.
CHELSEA CLINICAL SOCIETY
7.30 P.M. (47, Queen's Gate Terrace, S.W.7.) Major Keith Mant: Medical Experiments in Nazi Germany.

Wednesday, 10th

ROYAL COLLEGE OF SURGEONS
5 P.M. Mr. R. W. Raven: Surgical Manifestations of Boeck's Sarcoid. (Erasmus Wilson demonstration.)

Thursday, 11th

ROYAL COLLEGE OF PHYSICIANS
5 P.M. Dr. Wilkinson: Concerning Megalocytic Anæmias. (Second Oliver-Sharpey lecture.)
ROYAL COLLEGE OF SURGEONS
5 P.M. Mr. V. Zachary Cope: Varieties of Intestinal Obstruction.
INSTITUTE OF DERMATOLOGY
5 P.M. Dr. W. J. O'Donovan: Diseases of the Hair.

Friday, 12th

ROYAL COLLEGE OF PHYSICIANS
5 P.M. Dr. J. St. C. Elkington: Medical Aspects of Cerebral Tumour. (First lecture.)
ROYAL COLLEGE OF SURGEONS
5 P.M. Mr. Leon Gillis: Treatment of Arm Amputations, Cineplastic Surgery, and Arm Prostheses. (Arris and Gale lecture.)
ROYAL INSTITUTE OF PHILOSOPHY, 14, Gordon Square, W.C.1
5.15 P.M. Prof. A. J. Lewis: Philosophy and Psychiatry. (Manson lecture.)
LONDON CHEST HOSPITAL, Victoria Park, E.2
5 P.M. Dr. H. V. Morlock: Indications for Bronchoscopy in Chest Diseases.

Saturday, 13th

NUTRITION SOCIETY
(London School of Hygiene, Keppel Street, W.C.1.) All-day conference on Results of Recent Investigations into Nutritional Status in Great Britain.
BIOCHEMICAL SOCIETY
2 P.M. (University College, Gower Street, W.C.1.) Short papers.

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BRACHIAL NEURALGIA*

W. RUSSELL BRAIN
D.M. Oxfd, F.R.C.P.
PHYSICIAN, LONDON HOSPITAL AND MAIDA VALE HOSPITAL FOR NERVOUS DISEASES

MUCH of the progress of medicine consists of differentiating the one into the many, and this process is now at work on "brachial neuralgia," which may be defined as pain in the upper limb of nervous origin. Until quite recently the commonest cause of this was held to be "brachial neuritis" or neuritis of the brachial plexus. So far as I know, no pathologist has ever observed such a condition. Nevertheless, since the termination "itis" suggested inflammation, many patients had their teeth or tonsils removed to eliminate the cause of something no more substantial than a verbal suffix, and few of us were guiltless of this muddled thinking. Now we are discovering that the causes of "brachial neuritis" are many and varied, and treatment can succeed only if it is based on an accurate diagnosis. Similarly "cervical rib" held the field for a long time as a cause of brachial neuralgia till it was found that the symptoms of "cervical rib" might be present without a rib, or absent with a rib; and that the causes of the "thoracic inlet or costoclavicular syndrome" are multiple and complex. In opening this discussion, therefore, I plead for a confession of ignorance when we are ignorant and a healthy scepticism towards any dogmas put forward, whether they appear venerable because of their age or attractive on account of their youth.

Neurology begins with anatomy; so I must first remind you of certain anatomical points which have a bearing on diagnosis. The diagnosis of a lesion of a posterior root or spinal nerve from that of a cord of the brachial plexus or a peripheral nerve depends partly on a knowledge of the cutaneous distribution of sensory fibres from the respective spinal segments or dermatomes and peripheral nerves. Fig. 1 shows what appears to be the commonest arrangement, but with a prefixed plexus the dermatomes move up one segment, and with a postfixed plexus down one segment. There is another variation in which C6 supplies the radial half of the middle finger, and C7 adjacent halves of the middle and ring fingers.

This diagram may be quite misleading unless it is realised that it represents only cutaneous sensibility and is anatomical and not physiological. Take, for example, the 7th cervical spinal nerve. One might expect that a lesion of this root on one side would cause pain and cutaneous sensory loss over the 7th cervical dermatome—the whole dermatome and nothing but the dermatome. This, however, is not true. Some textbooks show no cutaneous innervation over the shoulder between C4 and D2, but a patient with herpes zoster of the 7th cervical posterior-root ganglion may have an eruption on the shoulder. The dorsal aspect of the shoulder, therefore, receives innervation from C7, and irritation of this spinal nerve causes pain to be referred to the shoulder. Moreover, the same spinal nerve supplies motor and sensory impulses to muscles which are quite remote from the dermatome. Irritation of the 7th cervical posterior root or spinal nerve, therefore, may cause pain and deep tenderness in any muscle which receives innervation from this spinal segment. Among these muscles are splenius, latissimus dorsi, pectoralis major, serratus anticus, and the flexors and extensors of the wrist and fingers. Pain and tenderness may therefore be felt in the neck or the shoulder, along the posterior border of the scapula, and in the pectoral region as well as in the distribution of the dermatome along the middle of the dorsal and volar aspects of the arm and forearm, hand, and middle finger.

Most lesions of cervical spinal nerves are partial, and partial lesions do not affect all forms of sensibility equally or all parts of the dermatome to the same extent. Subjective symptoms—e.g., pain, tingling, and numbness—are commoner than objective sensory loss. Analgesia is more extensive than anæsthesia, is usually only relative, and tends to be very patchy within the dermatome. Appreciation of passive movement in the fingers is usually unimpaired by a lesion of a single spinal nerve. Motor symptoms are less prominent than sensory symptoms; muscular wasting and weakness are usually only slight; fasciculation may be present; and the segmental tendon-reflexes—in the case of C7 the triceps-jerk—are diminished but usually not completely lost.

SPINAL TUMOUR

Spinal tumour must be borne in mind as a possible, though somewhat rare, cause of brachial neuralgia. Pain is usually due to compression of a spinal posterior root, less often of pain fibres within the spinal cord. From an early stage it is accompanied by signs of compression of the spinal cord itself. Queckenstedt's test usually yields some evidence of obstruction of the spinal subarachnoid space, but the cerebrospinal fluid may show little or no rise of protein content when the compression is in the neck.

CERVICAL SPONDYLITIS

Cervical spondylitis may cause brachial neuralgia because loss of intervertebral disc space or osteophytic outgrowths cause narrowing of intervertebral foramina (fig. 2). This may happen at one intervertebral space only, and the symptoms, which are then usually unilateral, are those of a partial lesion of a spinal nerve just described and depend for their distribution on the particular nerve involved. The 7th and 6th cervical nerves suffer most frequently.

A more diffuse form involves several adjacent vertebræ, and in such cases the symptoms are multisegmental and usually bilateral. Pain and tingling in the digits, together with muscular wasting and weakness and cutaneous sensory loss in the fingers, may cause crippling disability.

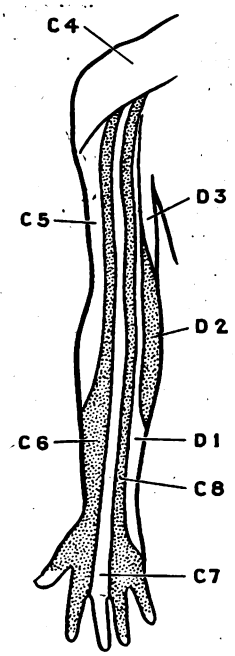

Fig. 1—Usual distribution of dermatomes in upper limb.

HERNIATED CERVICAL INTERVERTEBRAL DISC

The clinical picture of herniated cervical intervertebral disc has only recently been recognised and is probably still incomplete. As regards the upper limb, the symptoms are those of an irritative partial lesion of one spinal nerve, most often C7. The symptoms therefore have much in common with spinal neuritis secondary to narrowing of the intervertebral foramen by osteo-arthritis. Moreover on "straight" radiography the appearances may be similar. I doubt if we have at present sufficient knowledge to enable us to base the diagnosis entirely on clinical examination and "straight" radiography. Nevertheless in my experience the following diagnostic points have been helpful. The patient with a herniated cervical disc usually complains of considerable pain in his neck, whereas in cervical spondylitis with brachial neuralgia

* Paper read in opening a discussion at the Section of Physical Medicine, Royal Society of Medicine, on Nov. 12, 1947.

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the contrast between the radiological abnormalities and the absence of pain is often striking. Even when the spondylitis involves the greater part of the cervical spine, the patient may not complain of pain in the neck. The pain of herniated disc, together with the nervous symptoms, may develop suddenly; it is made worse by movements of the neck, and as a rule the patient finds that he must lie on his back, because lying on either side makes the pain in the shoulder and arm worse. The root pain of herniated disc is often intensified by coughing and sneezing. Active and passive movements of the neck may be painful and limited and may increase the radicular pain both in patients with herniated disc and in those with simple spondylitis, but usually to a greater extent in the former. Finally, whereas loss of disc space and localised osteo-arthritic changes may be common to both conditions, loss of disc space without osteo-arthritis should suggest a herniated disc. In doubtful cases it may be necessary to resort to myelography. Compression of the spinal cord is a rare complication of a herniated cervical disc, but spinal symptoms coinciding with radiological changes in the vertebræ are not conclusive evidence that a protruded disc is the cause; for obscure degenerative changes in the spinal cord sometimes complicate spondylitis, and the coincidence of Charcot's arthropathy of the cervical spine with syringomyelia may raise a difficult point of diagnosis.

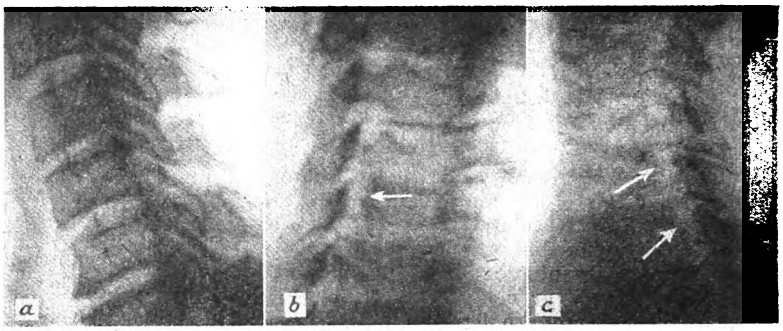

Fig. 2—Cervical spine in patient with left brachial neuralgia and sensory loss over C6 and C7 dermatomes: (a) lateral view; (b) right oblique view; (c) left oblique view. Radiograms (Dr. James Bull) show osteo-arthritic changes with osteophytes on both sides at C4–C5 and C5–C6 articulations. Oblique views show narrowed intervertebral foramina.

COSTOCLAVICULAR SYNDROMES

Much work has been done recently on those neurovascular disorders that cluster round the root of the neck, a region that the course of human evolution has left in a plastic state and therefore liable to variation. I have discovered in the literature (Swank and Simeone 1944, Learmonth 1947) allusion to fourteen major abnormalities in this area, any of which may be responsible for symptoms: (1) an abnormal 7th cervical transverse process; (2) a fibrous band from the 7th cervical transverse process to the first rib (ligamentum costopleurovertebrale); (3) cervical rib; (4) a first rib of abnormal shape; (5) an unusually high first rib; (6) cervicodorsal scoliosis; (7) an abnormal origin of scalenus medius; (8) an abnormal insertion of scalenus medius; (9) hypertrophy or spasm of scalenus anticus; (10) and (11) an abnormal origin or insertion of scalenus anticus; (12) the passage of neurovascular structures through the substance of scalenus anticus; (13) loss of power or tone in the elevators of the shoulder girdle, allowing the inner cord of the brachial plexus to impinge on a normal first rib; and (14) costoclavicular compression.

Thus it is convenient to divide the costoclavicular syndromes into those with and those without structural abnormalities. I shall not discuss the symptoms of the former, which are familiar enough, except to deal with one or two points. Considerable attention has been lately devoted to examination of the effect of various manœuvres of the shoulder or the arm on the radial pulse. In applying these tests to patients with costoclavicular syndromes it must be borne in mind that Falconer and Weddell (1943) found that backward and downward bracing of the shoulders impaired the radial pulse in 50% of normal men and 58% of normal women, whereas Telford and Mottershead (1947) observed this in 68%. In view of the importance which has been attached to the scalenus anticus it may be mentioned that hyperextension of the neck mechanically tightens this muscle, and rotation of the head to the opposite side, combined with lateral flexion to the ipsilateral side, contracts it. In this way the rôle of this muscle in the production of symptoms can be investigated. The view that widespread pain irradiating into the neck, precordial region, back, and arm might be produced by spasm of the scalenus anticus was put forward by Briscoe (1921).

Every patient requires the fullest clinical examination of the motor, sensory, autonomic, and vascular systems of the upper limb and the supraclavicular fossa, and radiography of the whole cervical and upper dorsal spine, oblique as well as lateral and anteroposterior views being taken to show the intervertebral foramina (fig. 2). Even so, the precise mode of production of symptoms may remain in doubt until operation. On the other hand, it may remain in doubt even then, unless a previous thorough clinical examination can be used to interpret the surgical findings.

As regards treatment, so long as the symptoms and signs are purely sensory, the condition may safely be treated by exercises of the shoulder-shrugging type; but, when muscular wasting or vasomotor symptoms are present, surgery is essential, and the operation should be fully exploratory.

It is only recently that one form of the symptom, known as acroparæsthesiæ and long familiar in middle-aged women, has been recognised as a costoclavicular syndrome. The increased fatigue of war-time, especially the carrying of heavy baskets by overworked housewives, is probably the reason why this syndrome has become much commoner, but it is not confined to this age or sex. The characteristic complaint is of awakening during the night or early morning with one hand, or more commonly both hands, tingling and feeling swollen and stiff and relatively useless. An hour or two after the patient gets up the hands feel normal again, and there are usually no abnormal physical signs on examination nor structural abnormalities to be seen on radiography. It is not clear why this symptom should be caused by lying down or how it is produced. It differs from the familiar symptoms of compression of nerve trunks in some respects and is probably vascular in origin. A long rest is said to relieve it but is usually impracticable; and, in view of the part played in its causation by weight-carrying, exercises to strengthen the shoulder elevators seem more rational, if almost as difficult to apply to tired middle-aged women. Empirically I have long used vasodilators with success, and find regular small doses of trinitrin and thyroid extract very effective.

COMPRESSION NEURITIS OF THE MEDIAN NERVES IN THE CARPAL TUNNEL

The spontaneous form of the syndrome of compression of the median nerve in the carpal tunnel was described almost simultaneously in the United States by Cannon and Love (1946) and in this country by Dickson Wright, Wilkinson, and myself (Brain et al. 1947). Like the costoclavicular syndrome, this syndrome may arise with or without structural abnormalities, the former usually consisting of fracture of the lower end of the radius or

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of the proximal carpal bones or osteo-arthritis of the wrist. Those patients without structural abnormalities have in our experience been women of middle age or older doing a good deal of manual work. The presenting symptom is a burning and tingling sensation in the cutaneous distribution of one median nerve, usually followed within a few months by the same symptoms in the other hand. On examination the thenar eminence is wasted, the abductor brevis and opponens pollicis muscles are weak, and appreciation of light touch, tactile discrimination, and sensitivity to pinprick are impaired over the distal parts of those digits supplied by the nerve. When the compression is secondary to bony change, operation is always required. In the spontaneous form expectant treatment, consisting of immobilisation, is justifiable only in early cases when the symptoms are predominantly sensory, and then is likely to succeed only if the patient can give up manual work. Otherwise decompression of the swollen nerve in the carpal tunnel gives almost immediate relief from pain and discomfort, and is followed by a slower improvement in sensation and voluntary power. Complete recovery may be expected in both, provided the condition has not been present too long. A somewhat troublesome sequel in some patients during recovery is a Raynaud-like syndrome due apparently to sympathetic irritability and most likely to arise during the first winter after operation.

REFERENCES

Brain, W. R., Wright, A. D., Wilkinson, M. (1947) *Lancet*, i, 277.
Briscoe, C. (1921) *Ibid*, ii, 1257.
Cannon, B. W., Love, J. G. (1948) *Surgery, Wash.* 20, 210.
Falconer, M. A., Weddell, G. (1943) *Lancet*, ii, 539.
Learmonth, J. R. (1947) *Thorax*, 2, 1.
Swank, R. L., Simeone, F. A. (1944) *Arch. Neurol. Psychiat., Chicago*, 51, 432.
Telford, E. D., Mottershead, S. (1947) *Brit. med. J.* i, 325.

FORMATION OF HEPATIC GLYCOGEN IN NORMAL AFRICANS AND IN THOSE SUFFERING FROM MALIGNANT MALNUTRITION

E. G. HOLMES M.D. Camb., M.R.C.P.
H. C. TROWELL M.D. Lond., F.R.C.P.

From the Departments of Physiology, Makerere College and Mulago Medical School, Kampala, Uganda

Trowell and Muwazi (1945a and b) have described the condition known as "malignant malnutrition." The name "kwashiorkor" has also been used, but in the present state of our knowledge malignant malnutrition seems preferable. It is very refractory to treatment and displays itself by pallor of the negro skin and hair, macrocytic anæmia, inability to digest food, deficiency bowel pattern, œdema, a decrease of the plasma-albumin, and an increase of the plasma-globulin.

Severe fatty changes are present in the liver, and serial liver biopsies (Davies 1948) have shown that in Uganda these fatty livers often proceed to a fine cirrhosis of the portal tracts. Accumulations of iron pigment (Gillman and Gillman 1945a and b) have not been noted here. These fibrotic changes may well be irreversible; but, even before they develop, cases prove refractory to all forms of treatment, including hog's stomach. Cases do not seem to respond normally to the diet taken, and anorexia and poor digestion of food (causing meat, starch, and fat to appear in the stools) render recovery difficult. From many angles it appeared that essential metabolic functions had been profoundly modified, and an attempt was therefore made to study the formation of glycogen in the liver after the administration of glucose.

Since one of us (H. C. T.) was already using liver biopsy for histological study, we decided to examine the ability of the liver to store glycogen after glucose injection, using the biopsy specimens for chemical investigation. A failure to store glycogen would not necessarily indicate damage to this particular hepatic function, since in malnutrition other tissues might compete with the liver more strongly than usual for intravenous glucose. It was hoped, however, that, if this were so, the fact might be indicated by the blood-sugar curve.

One of us had previously observed that in diphtheritic toxæmia in animals the liver was early and severely damaged, and that this damage could be demonstrated at an early stage by the inability of the liver to store glycogen after an injection of lactate; the ability to store glycogen after an injection of glucose was diminished, but not abolished (Cross and Holmes 1937, Dawson and Holmes 1939, Holmes and Lehmann 1940).

The tests here reported represent a preliminary attack from the biochemical angle before more comprehensive and detailed studies can be undertaken.

METHODS

1. *Glycogen.*—The liver-biopsy sample usually weighed 30–60 mg. The usual technique of glycogen estimation was therefore modified to deal with these unusually small samples.

The biopsy sample was ejected from the cannula on to filter-paper moistened in saline, quickly wiped free from blood, and placed at once in a centrifuge tube of capacity about 2 ml. and containing 0·2 ml. of 20% potash; tube and potash had previously been weighed. When all the samples (2 or 3) had been collected, the tubes were taken to the laboratory and reweighed. They were then immersed for a few minutes in a boiling-water bath, and shaken occasionally until all the tissue had dissolved. After this 0·4 ml. of 96% alcohol was added, an air condenser was inserted, and they were brought to boiling in the water-bath. This causes the precipitated glycogen to flocculate. They were then centrifuged in a small water-driven centrifuge, the fluid was poured off, and the precipitate was drained by inversion. Any drops of fluid adhering to the tube were removed with filter-paper, 0·5 ml. of *N* HCl was added, and they were hydrolysed for two hours in the water-bath. The fluid was next neutralised to phenolphthalein with *N* soda, filtered on a previously washed filter-paper, and filtrate and washings were made up to 10 ml.

Since the amount of glucose present was small, the Hagedorn and Jensen (1923) blood-sugar method was modified for its determination as follows: 0·5 ml. of ferricyanide reagent was used; after heating on the water-bath for 15 min. and cooling, 1 ml. of a mixture of zinc sulphate and sodium chloride and 1 ml. of 3% acetic acid were added, and the titration was carried out with *N*/400 thiosulphate from a 1 ml. microburette.

A reduction curve was constructed from the results obtained by estimating a sample of glucose which had been thoroughly dried. The range was from 0·005 to 0·07 mg. of glucose. Blanks were prepared with 0·5 of HCl neutralised with soda, filtered, and made up to 10 ml. The fraction of the total fluid needed to give suitable titration figures varied from experiment to experiment, and was determined by trial and error.

A series of estimations on small pieces of guineapig liver gave satisfactory agreement.

2. *Blood-sugar* was determined by the method of Hagedorn and Jensen (1923).

3. *Serum-proteins* were determined by the only method for which equipment was available at the time—the biuret method.

4. A possible source of error would clearly be variations in the water content of the liver which might follow the intravenous injection of glucose. It would have been desirable to determine the wet weight/dry weight ratio of every biopsy specimen, as well as its glycogen content. This was unfortunately impossible, since only occasionally could sufficient tissue be obtained for both water and glycogen determinations. Water determinations in cases 8 and 10 showed that the water content in case 8 was slightly lower in the second biopsy specimen than in the first, whereas in case 10 it progressively increased. The difference, however, was not such in either case as to alter the results materially.

5. All patients fasted from the night before the test; tests could not, unfortunately, always be performed at

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the same time of day, owing to other calls on one or both of us; they were begun either at 8.30 A.M. or 1.30 P.M. All patients received gr. 15 of chloral, gr. 15 of bromide, and gr. $^1/_2$ of morphine an hour before the test. The procedure was as follows:

A sample of blood was withdrawn from a vein for initial blood-sugar determinations and for serum-proteins.

The abdominal wall and peritoneum were infiltrated with procaine, and the first biopsy specimen obtained. The epigastric route was used, the right lobe of the liver being pierced with a special instrument modified from the original Gillman pattern (Gillman and Gillman 1945a and b). This has been used in 100 cases without a fatality.

Glucose 50 g. dissolved in a pint of water and sterilised was run into a vein as quickly as possible. The completion of this operation was taken as zero time for the collection of further specimens.

As quickly as possible a further specimen of blood was withdrawn (not from the limb used for glucose injection) for blood-sugar.

Further specimens of blood were withdrawn at zero + 60 min. and zero + 120 min., and further biopsies performed, in earlier tests at zero + 120 min., in later tests both at zero + 60 min. and zero + 120 min. If, as sometimes happened, these times could not be strictly adhered to, the fact was allowed for in constructing the curve.

6. It would not have been satisfactory to administer a dose of glucose calculated on the body-weight, because all the malnutrition patients were œdematous, and many of them held many pints of œdema fluid or effusions. Therefore in all except case 6, an infant who received a dose of glucose calculated on 5/7 g. per kg. of body-weight, a dose of 50 g. of glucose was given.

7. Liver glycogen has often been shown in animals to increase after the administration of glucose, but we are not aware that a similar increase has previously been directly demonstrated in man. Though no serious doubt could be entertained that it did so increase, the onus of proof that it was demonstrable under the particular conditions of our tests (fasting period, glucose dosage, premedication, local anæsthesia) lay upon us, and made it necessary to perform a number of tests on controls. The selection of controls was not easy, and was only undertaken when the whole procedure had been practised several times and was considered reasonably safe. They were all inpatients with no obvious defect of nutrition. The nature of the various procedures was explained to them, and of those selected about a third agreed. No untoward event attended the investigation of these controls, and without these volunteers

CLINICAL AND LABORATORY FINDINGS

Case no.	Age (yrs.)	Blood-sugar (mg. per 100 ml.)				Liver glycogen (mg. per g.)			Serum-protein (g. per 100 ml.)				Red cells (millions)	Hb %	Remarks
		Initial	After glucose	After 1 hr.	After 2 hr.	Initial	After 1 hr.	After 2 hr.	Total	Albumin	Globulin	A./G. ratio			
1	26	89	314	146	137	18·4	—	25·7	3·75	2·89	0·86	3·36 : 1	3·2	69	Clinically malnutrition. Œdema + + +. Died 80 days later. No response to treatment. Necropsy findings: normal liver, advanced fibrosis of pancreas, lesions in kidney.
2	22	87	278	166	71	—	—	—	7·74	4·9	2·84	1·73 : 1	4·8	100	Control. Chest pain due to pleural thickening. Biopsy not done.
3	24	29	220	96	77	11·8	—	10·5	3·93	0·53	3·4	0·16 : 1	3·03	73	Malnutrition. Almost comatose at beginning of test. Revived with glucose. Died 24 hr. later. Necropsy findings: fatty liver, early fibrosis of pancreas, aortic syphilis. Kahn + + +.
4	25	108	440	188	164	48·6	—	31·9	5·27	1·88	3·39	0·55 : 1	1·4	32	Clinically malnutrition. Œdema + + +. Liver biopsy: fine periportal fibrosis and lymphocytic infiltration. No fat. Glycogen visible. Recovered.
5	25	88	368	164	109	8·2	—	17·6	5·94	1·7	4·24	0·4 : 1	3·9	87	Died 45 days later. Œdema + + +. Clinical diagnosis of subacute hepatic necrosis confirmed by biopsy and necropsy.
6	2	98	282	110	81	23·4	—	23·3	4·74	1·26	3·48	0·36 : 1	1·1	28	Malnutrition. Malignant tertian malaria. Cancrum oris. Œdema + + +. Died 24 hr. later. Necropsy finding: bronchopneumonia.
7	30	99	290	—	—	13	—	26	—	—	—	—	—	—	Control. Abdominal pain, cause unknown. No abnormal physical signs.
8	15	80	471	268	218	43·5	40·3	36·6	4·54	0·5	4·06	0·12 : 1	3·4	75	Malnutrition. Œdema + + +. Ascites + + +. Liver biopsy: early perilobular fibrosis.
9	18	89	452	299	295	24·2	19·7	17·5	4·66	0·51	4·15	0·12 : 1	2·53	44	Clinically malnutrition. Moderate œdema of legs. Died 24 hr. later. Necropsy finding: tuberculous pneumonia, chiefly left-sided.
10	40	65	456	255	216	11·9	10·7	10·9	6·09	3·54	2·55	1·4 : 1	2·76	40	Clinically malnutrition. Œdema + + +. Ascites +. Biopsy: liver very fatty, with fine fibrosis. Died 24 hr. later. Necropsy findings: liver-biopsy findings confirmed, pancreas much fibrosed, islets scanty.
11	18	95	412	202	184	38	—	33·8	3·8	0·95	2·85	0·33 : 1	2·3	58	Malnutrition. Œdema + +. Test done on Dec. 6, 1946. Same patient as case 14.
12	18	91	476	247	148	20·4	33·3	24·7	8·43	2·89	5·54	0·52 : 1	3·75	73	Control. Right spastic hemiplegia. Kahn negative, but history of penile sore.
13	25	85	392	211	115	26·3	29·5	27·5	7·65	3·2	4·45	0·71 : 1	5·6	110	Control. Chest pain, probably old pleural adhesions.
14	18	73	282	123	72	36·7	—	42·9	6·01	3·01	3·0	1 : 1	—	—	Same patient as case 11, clinically recovered. Test done on Feb. 16, 1947.
15	32	123	—	166	—	9·5	19·6	20·3	0·07	2·9	6·17	0·47 : 1	—	—	Control. Severe right hemiplegia. Kahn + + +.

Tribes: cases 1, 3, 4, 5, 6, and 9 Ruanda; cases 2 and 13 Muganda; case 7 Acholi; cases 8, 11, and 14 Rundi; case 10 Ankoli; case 12 Muziba; case 15 Ganda.

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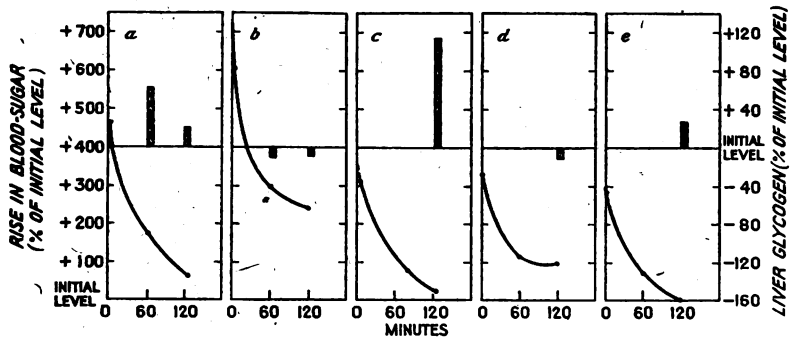

Fig. 1—Liver-glycogen and blood-sugar levels: (a) in control (case 12); (b) in "malignant malnutrition" (case 10); (c) in subacute hepatic necrosis (case 5), showing normal response in liver disease other than malignant malnutrition; (d) in malignant malnutrition (case 11); (e) in same patient after clinical recovery from malignant malnutrition (case 14), showing return to normal findings. For reasons of space, examples only of the curves are given. In no case were opposite results obtained.

it would have been impossible to prove that glycogen storage took place in the circumstances of our test, as it did in all four cases in which it was tested.

8. The malnutrition cases were selected on a clinical basis. All were males. The history was always of several months' illness, with weakness, wasting, swelling of the abdomen and often of the limbs, and commonly of diarrhœa. The dietetic history varied, but meat was never eaten more than once a month, and was usually absent from the diet. Milk and milk products were absent, as were eggs. The food was commonly matoke (banana) or lumonde (sweet potato) as a staple, with various green vegetables and occasionally some pea-nuts.

In some of the cases preliminary liver biopsy was performed for histological study. All patients were wasted, œdematous (many presenting gross anasarca), and anæmic, the highest red-cell count recorded being 3,900,000 per c.mm. Some of the patients showed evidence of ankylostomiasis. Five subsequently died, after periods ranging from 24 hours to 80 days. Of these, case 9 was found at necropsy to have tuberculous bronchopneumonia; case 6, an infant, had cancrum oris and bronchopneumonia; and case 3 had syphilitic aortitis. In the remainder, both of those who died and of those who survived, malnutrition appeared to be uncomplicated, except, as already stated, by ankylostomiasis in some instances. Latent malarial infection can never be excluded in Africans in Uganda, and some of the patients gave positive Kahn tests.

RESULTS

The results of the tests are set out in the table and in fig. 1. The table gives actual values, whereas fig. 1 shows typical changes in blood-sugar and liver-glycogen levels as percentages of the initial values.

Liver Glycogen

In all the controls tested (nos. 7, 12, 13, and 15) and in the patient who had recovered (case 14) there was an increase in glycogen after glucose administration, whereas of malnutrition cases 1, 3, 4, 6, 8, 9, 10, and 11 all but case 1 showed a fall in glycogen after glucose. Since cases 6 and 9 had acute infections they are excluded from the argument, and the data are included for interest only. Cases 1 and 5 present features of particular interest which, we think, materially strengthen the argument that in malnutrition there is a real derangement of hepatic function.

Case 1 presented a history and clinical signs of gross malnutrition: œdema, anorexia, wasting, diarrhœa, undigested food in stools, deficiency bowel pattern on radiography, and anæmia. But, though the level of his total serum-proteins was low, his serum-albumin level was higher, and his blood-sugar curve was nearer to that of the controls than were those of other malnutrition cases; and histologically neither at biopsy 26 days, nor at necropsy 80 days, after the test were there signs of present or past hepatic disease. Clinically the cause of death was malnutrition with complete lack of response to treatment. At necropsy no lesion of the liver was discovered, but there was much fibrosis of the pancreas and lesions in the kidney described as hyaloglomerulitis.

Case 5 was one of subacute hepatic necrosis and nodular hyperplasia, confirmed both by biopsy 56 days before, and at necropsy 45 days after, the test. At the time of the test there was gross œdema and ascites. The liver glycogen was low, but increased by 116% after glucose. The serum-albumin was low, and the blood-sugar curve approximated to that of the controls.

These results all fit in with the demonstrated presence of liver tissue decreased in amount but functioning normally. Both cases 1 and 5 also show that gross œdema and ascites do not alone prevent an increase in liver glycogen, as they might conceivably do by causing a large proportion of the injected glucose to stagnate in a pool of extracellular fluid.

Case 14 is of interest in that the subject is the same as case 11, the test shown in case 14 being performed 66 days later than that shown in case 11 and after clinical recovery had taken place. It may be suggested that in severe malnutrition, in which absorption by the gut may be diminished, injected glucose may be seized by the tissues in general with such avidity that the amount available for glycogen storage in the liver is greatly diminished, so that storage is either transient or absent. But if this were so it should be reflected in a more rapid fall of the blood-sugar level after glucose injection than in the controls. The table and figures show that the opposite was found: there is a marked decrease in glucose-tolerance after intravenous glucose.

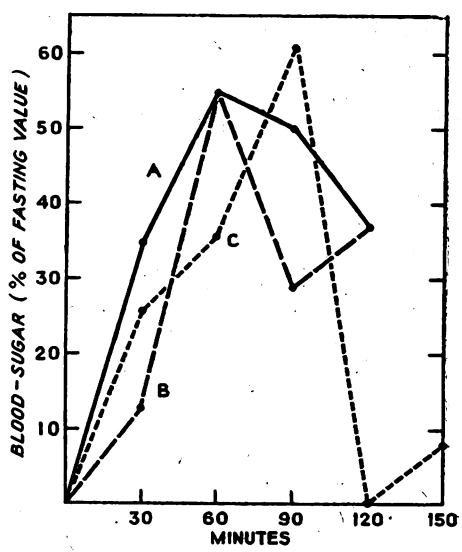

Fig. 2—Glucose-tolerance curves plotted as percentage changes from initial values after administration of sugar by mouth: A, B, two cases of severe malignant malnutrition in young children; C, normal African adult control; showing that findings in malignant malnutrition were not due to malabsorption.

The figures for serum-protein are almost all abnormal compared with accepted standards, both in the controls and in the malnutrition cases. The serum-albumin levels in the malnutrition cases, however, were lower than in the controls. This was not due to technical errors, because control determinations on normal Europeans and on healthy African volunteers gave figures within the accepted range. It is not proposed to discuss this in detail here; much more work needs to be done. Many other workers have reported decreased figures for serum-albumin in malnutritional states.

Blood-sugar

Fig. 1 shows typical blood-sugar curves, and liver-glycogen levels calculated as percentage changes from

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initial values to assist comparison. They illustrate (1) shape of blood-sugar curve and rise in liver glycogen in controls; (2) diminished glucose-tolerance and fall in glycogen in malnutrition cases. Fig. 2 shows two glucose-tolerance curves plotted as percentage changes from initial values after sugar had been given by mouth. Both subjects were young children with severe clinical malnutrition. Neither of them showed any definite defect in glucose absorption, though B shows some irregularity. Both show a greatly delayed fall. Curve C, shown for comparison, was obtained from a normal adult African student.

CONCLUSIONS

Evidence is brought to show that in the type of malnutrition which is common among Africans in East Africa there is a failure in liver function, one manifestation of which is a failure on the part of the liver cells to store glycogen, even when presented with abundant glucose by intravenous injection. No doubt this is but one aspect of the functional derangement, and we cannot at present assess its importance in the whole picture.

The liver cells are by no means glycogen-free; the lowest figure we observed in a malnutrition case was a little over 1%. The liver cells must therefore still be capable of synthesising glycogen, though not apparently directly from glucose. They are also apparently capable of mobilising glycogen, since in only case 3 was hypoglycæmia observed, even after 24 hours' fast, and the glycogen content of the liver falls observably during the 2 hours of the test. It is to be assumed that such a fall is in any case taking place (equilibrium would presumably be established at some fairly low level of liver glycogen) and that it might be even more rapid if no glucose were injected, since the increased blood-sugar presumably diminishes the demands made on the liver for sugar.

Recent biochemical studies offer endless opportunities for speculation about the nature of the failure, but discussion of them is fruitless without further investigation.

REFERENCES

Cross, M. C. A., Holmes, E. (1937) *Brit. J. exp. Path.* **18**, 370.
Davies, J. N. P. (1948) *Lancet*, Feb. 28, p. 317.
Dawson, C. R., Holmes, E. (1939) *Brit. J. exp. Path.* **20**, 357.
Gillman, T., Gillman, J. (1945a) *J. Amer. med. Ass.* **129**, 12.
— — (1945b) *Arch. intern. Med.* **76**, 63.
Hagedorn, H. C., Jensen, B. N. (1923) *Biochem. Z.* **135**, 46.
Holmes, E., Lehmann, H. (1940) *Brit. J. exp. Path.* **21**, 196.
Trowell, H. C., Muwazi, E. M. K. (1945a) *Trans. R. Soc. trop. Med. Hyg.* **39**, 229.
— — (1945b) *Arch. Dis. Childh.* **20**, 110.

SPINAL-CORD LESIONS IN CEREBROSPINAL FEVER

REPORT OF FOUR CASES

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THOUGH attention has been paid to the encephalitic form of cerebrospinal fever (Banks and McCartney 1942) and its cerebral sequelæ—i.e., mild mental deterioration and personality changes comparable with those seen after closed head injuries (Pai 1945, 1946, Ballard and Miller 1945)—little interest has been taken in spinal-cord lesions developing either during the acute phase of the illness or after a delay of weeks or months.

Gowers (1893) mentioned that in rare cases a complete paraplegia might develop in cerebrospinal fever.

Sophian (1913) noted that in a small percentage severe paralyses of spinal origin were seen; he also recognised the delayed spinal sequelæ during convalescence, when a spastic paraplegia with ataxia might develop.

During the epidemics of 1914–18 occasional cases were noted: Rolleston (1919) found 1 case of paraplegia among 502 cases of cerebrospinal fever in naval personnel, and Worster-Drought and Kennedy (1919), in a series of cases during an epidemic, had 1 which developed a flaccid paraplegia on the 26th day; though death took place, no necropsy was done. Smithburn et al. (1930), in a series of 144 cases, had 1 with paraplegia.

Borovsky (1939) and Farmer (1945), in studies of the neurological complications in 190 and 300 cases respectively, do not mention spinal-cord lesions.

Two statistical surveys of the prognosis of cerebrospinal fever in this country were made after the 1940–41 epidemic. Degen (1945) followed up 986 cases and found that 8 patients were said to be lame or unable to walk; but the causes for this could not be determined by the methods of the survey. Beeson and Westerman (1943) analysed the case-records of 3575 patients treated with sulphonamides in various hospitals and noted that 13 patients had paralysis of the extremities, in 6 of them apparently permanent. Here again it was impossible to be sure from the records whether the paralyses were of spinal origin or not.

The spinal cord may be implicated in the acute phase of the disease, or complete recovery from the acute illness may take place and, weeks or months later, progressive interference with spinal-cord function may result from diffuse arachnoiditis due to the preceding meningitis. During the acute phase of the illness two main types of lesions occur: an acute transverse myelitis, and a poliomyelitic type.

ACUTE TRANSVERSE MYELITIS

According to Dopter (1921) transverse myelitis is commoner than the poliomyelitic type; but the clinical picture which he described suggests delayed spinal arachnoiditis, and he found only 1 clearly described case of transverse myelitis due to cerebrospinal fever (De Massary and Chatelin 1910):

This patient developed an acute transverse lesion of the cord associated with backache and fever. On lumbar puncture 3 ml. of thick coffee-coloured cerebrospinal fluid (C.S.F.) was obtained, which yielded a pure culture of meningococci. The patient died six days later in delirium, and necropsy showed diffuse lesions with small hæmorrhages throughout the lumbar cord, and pus surrounding the cauda equina and lumbar enlargement.

Wilkins (1925) described an acute lesion of the conus medullaris in a child, aged 2½ years, during the first week of cerebrospinal fever, with loss of sphincter control, impairment of sensation in the lower sacral segments, and an ulcer in the anal fold, and it is probable that this lesion was due to the cerebrospinal fever. Two years later there had been some improvement, but there were still urinary incontinence and sacral loss of sensation. Though this type of lesion developing in the course of an acute infection is usually regarded as inflammatory, it may well be the result of thrombosis.

POLIOMYELITIC TYPE

The poliomyelitic form was originally recognised by Sicard (Raymond and Sicard 1902, Sicard and Foix 1910), and only 3 cases appear to have been reported since (Simonin 1911, Worster-Drought 1918, Ribadeau-Dumas et al. 1937, 1938). To this list I add the following 2 cases.

Case 1.—In April, 1941, an infantry officer, aged 21, had developed severe headaches, accompanied by general malaise, shivering, and dyspnœa on exertion.

After this had lasted three days, both legs had felt weak and had collapsed when he had tried to walk. He had found that there was no useful power in the hips and knees, but he had been able to move his ankles and toes normally.

Since his headaches had become worse and his general condition had deteriorated, he had been admitted to a casualty-clearing station, where he had been found to be mildly delirious, with neck rigidity and retention of urine.

A lumbar puncture had shown a turbid C.S.F. under increased pressure, 110 polymorphs per c.mm.; and intracellular and extracellular gram-negative cocci had been found in direct smear.

A culture had yielded meningococci type 2 Gordon. Cerebrospinal fever had been diagnosed, and he had been treated with sulphapyridine by mouth.

When the acute symptoms had subsided he had been transferred to a convalescent home and admitted to Hurstwood Park E.M.S. Hospital on Aug. 1, 1941.

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On admission the patient said he had little memory of the first three or four days in the casualty-clearing station; and that, when he had regained consciousness, there had been still profound weakness of both hips and knees; some improvement in the right leg had started about a week later, and in the left leg about three weeks later.

On examination: cranial nerves and arms normal; slight weakness of oblique muscles of abdomen and of lower part of erector spinæ; considerable wasting of quadriceps femoris and adductors of both sides and a lesser degree of wasting of glutæi. No fibrillation. Passive movements of joints free and painless.

Right leg: no voluntary power in hip adductors; minimal power in hip flexors and abductors; moderate power in hip extensors; only a weak voluntary contraction of quadriceps femoris. Power in hamstrings practically normal; muscles acting on ankle and toes normal in power.

Left leg: no voluntary power in flexors or adductors of hip or in quadriceps femoris; minimal power in hip abductors; moderate power in hip extensors and in hamstrings; normal power in other muscles.

Reflexes: arm-jerks normal; abdominal reflexes and knee-jerks absent; right ankle-jerk normal, left just present; both plantar responses flexor. No impairment of sensation.

Lumbar puncture: no evidence of spinal block by Queckenstedt's test; C.S.F. contained 2 cells per c.mm.; protein content 100 mg. per 100 ml.

Wassermann reaction negative in blood and C.S.F. Radiography of lower dorsal and lumbar spine showed no abnormality. Electrical testing of muscles showed no response to faradism or to galvanism in left hip adductors, and no faradic response but a sluggish contraction to strong galvanism in left quadriceps and right hip adductors. In the other muscles a faradic response was obtained.

Progress.—During the next two months with intensive physiotherapy there was some improvement in power, and he became able to walk a little with the aid of a stick, though there was still no trace of voluntary power in the adductors of either hip.

Case 2.—A R.A.F. officer, aged 25, while serving in M.E.F. in April, 1942, had developed stiffness and pain in the lower part of the back.

A few days later severe headache and fever had started, and he had been admitted to a general hospital, where lumbar puncture had shown many polymorphs and meningococci. He had been treated with sulphapyridine by mouth and by intramuscular injection.

He had little memory of his first two or three weeks in hospital; and when he had come round he had found weakness of the shoulder girdles and of the legs and back. There had been no pain and no dysæsthesia.

He had been evacuated to England and admitted to a military hospital on May 24, 1943. During the intervening period there had been gradual improvement in the weakness.

On Examination.—Right arm: much wasting and weakness of supraspinatus, infraspinatus, deltoid, biceps, and flexors of wrist and fingers, and small hand muscles; slight weakness of extensors of wrist and fingers; right biceps-jerk absent, supinator-jerk feeble, and triceps-jerk normal.

Left arm: moderate wasting and weakness of all shoulder-girdle muscles, especially deltoid, and normal power in other muscles; biceps-jerk feeble, triceps-jerk and supinator-jerk normal.

Legs: moderate wasting and weakness of glutæi and quadriceps in both legs, right leg being more affected; knee-jerks feeble, ankle-jerks normal, plantar responses flexor. No impairment of sensation; no fibrillation.

Electromyography (Dr. G. Weddell) of selected wasted muscles showed a mixture of fibrillation action potentials and motor unit potentials.

With physiotherapy during the next two months there was gradual improvement in the patient's condition.

In these 6 cases of the poliomyelitic type of spinal-cord lesion the evolution of the disease is essentially similar: during the first few days of a typical attack of cerebrospinal meningitis there is a rapid onset of a flaccid paralysis of one or more limbs, with disappearance of the tendon-jerks but no impairment of sensation; the paralysis may spread to other limbs in the next forty-eight hours. In two or three weeks muscle wasting appears and, in the more severely affected muscles, reaction of degeneration on electrical testing. If these cases are seen some time after the acute illness, it is impossible to distinguish them from convalescent cases of acute anterior poliomyelitis, unless full records of the C.S.F. in the original illness are available, and this mistake was made in case 1. A protein content of 100 mg. per 100 ml. of C.S.F. without manometric evidence of subarachnoid block three months after the acute illness might also be found after anterior poliomyelitis. There is no reasonable doubt, however, that my 2 cases and the 4 others recorded had meningococcal meningitis, because meningococci were found in the C.S.F. in all 6 cases, and the coincidental occurrence of anterior poliomyelitis and cerebrospinal fever in the same patient seems to be out of the question.

The prognosis (from the few recorded cases) seems to be the same as in anterior poliomyelitis: Sicard and Foix's (1910) patient began to improve after a few weeks; Worster-Drought's (1918) had recovered completely in seven months, when all four limbs had been affected at the onset; Simonin's (1911) patient still had severe wasting and weakness after eighteen months; and my 2 patients were improving slowly four months and fifteen months after the acute illness. The patient of Ribadeau-Dumas et al. (1937, 1938) died on the fourth day, but the necropsy was unsatisfactory, as it was done too late after death and the tissues were not thoroughly fixed. The anterior-horn cells stained very poorly and appeared to be necrosed, but the authors thought that these changes might have developed post mortem. From the clinical picture in all the cases there certainly appears to be a lesion of the anterior-horn cells.

DIFFUSE SPINAL ARACHNOIDITIS

Symptoms of a spinal-cord lesion may develop a considerable time after recovery from an acute attack of cerebrospinal fever and are due to a diffuse arachnoiditis which constricts the cord and interferes with its blood-supply. The first proved case appears to be that of Batten (1916), which was operated on by Horsley; but there are earlier reports of patients who almost certainly had the same condition.

Hobhouse (1897) described a man of 21 who had had meningitis during an epidemic when he was aged 3 years and some years later had developed pains in the legs, followed by weakness, wasting, and rigidity, with only slight impairment of sensation.

Lejonne and Rose (1909), under the diagnosis of "central myelitis," and Simonin (1911) report cases of progressive spastic paraplegia developing some months after cerebrospinal fever, in which there seems no doubt that the cause was diffuse spinal arachnoiditis.

Sophian (1913) mentions that lesions of the spinal cord may develop during convalescence from cerebrospinal fever.

Since Batten's description, authenticated cases have been published by Barré et al. (1925), Bériel and Devic (1928), Divry and Lecomte (1930), Guillain and Sigwald (1932) (2 cases), Selinsky (1935), Stroe et al. (1935), and Stewart (1945).

I add here 2 further cases: one proved by necropsy, the other not yet proved but apparently a mild example.

Case 3.—A girl, aged 16, was admitted to the National Hospital, Queen Square, under Dr. Macdonald Critchley, on July 12, 1938, with weakness of the legs. At the age of 9 years, during an epidemic, she had had cerebrospinal fever and had been in an isolation hospital for three months under treatment: it is not known if intrathecal serum was used.

About three weeks after leaving the hospital she had found that her legs were gradually becoming weaker, and her ankles at times had turned over, and she had fallen down. The weakness of the legs had progressed slowly, and a year later she had been unable to walk. She had spent the eighteen months before admission to the National in a cripples' home. At no time had there been any pain or girdle sensations, and sphincter control had not been affected.

On examination: mentality normal; no abnormal signs in cranial nerves or in arms; some weakness of lower anterior abdominal muscles, as shown by upward deviation of umbilicus on raising the head; weakness of lower part of erector spinæ.

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Both legs very spastic in extension, with adductor spasm. No wasting but considerable reduction in voluntary power distributed generally throughout both legs, the left being the weaker. Abdominal reflexes very feeble, knee-jerks and ankle-jerks greatly exaggerated, ankle-clonus present, and both plantar responses extensor.

Sensation: between D7 and D12 segments a few light touches were missed, a pinprick was recognised as sharp but less so than on arms, and mistakes were made in appreciation of hot and cold; from D5 to D7 there was minimal impairment of same forms of sensation, and there was similar subjective change below D12 segment.

Sense of position was absent in toes, and appreciation of vibration was absent over malleoli and patellæ, diminished over the lumbar vertebræ, and normal over D7 spine and above. Slight mid-dorsal scoliosis, but no tenderness on percussion. Patient could not walk.

Lumbar puncture: initial pressure 60 mm.; on bilateral jugular compression this rose to 230 mm. and on release fell to 100 mm., both rise and fall being much slower than normal; abdominal pressure gave a brisk rise of 20 mm.; C.S.F. contained 3 lymphocytes per c.mm., and protein 100 mg. per 100 ml. Wassermann reaction negative in blood and C.S.F. Cisternal myelography showed hold up of 'Lipiodol' at D1–D2 vertebral junction.

Post-meningitic spinal arachnoiditis was diagnosed, and on July 28, 1938, Mr. Harvey Jackson performed a laminectomy from C7 to D6. There was some thickening of the dura, and gross adhesive arachnoiditis with a few small cysts but no circumscribed loculus of fluid. Spinal cord appeared small, and its outline was difficult to distinguish. An unsuccessful attempt was made to separate the arachnoid adhesions from the cord. Patient died about three hours after the operation.

Necropsy Findings (Dr. J. G. Greenfield).—Spinal cord alone was removed. At level of laminectomy and for several segments below, spinal cord very small and, throughout dorsal portion, intimately adherent to thickened meninges; hence it was impossible to dissect these off without injuring cord. Cauda equina was fairly free from adhesions, but dura here was thickened and rather adherent to arachnoid.

Histology.—Section of cord showed syringomyelia, with two or three cavities surrounded by thick glial walls more or less concentric with wall of cavity.

Owing to damage to cord by attempts to cut dura longitudinally on dorsal surface, exact position of cavities could not be made out. They did not involve central canal, which lay anterior to them. They appeared to involve most of grey matter of cord; at least no nerve-cells could be seen in more affected segments, but a fair number of myelinated fibres were seen passing up and down in peripheral parts of cord.

Considerable lymphocytic infiltration in meshes of greatly thickened arachnoid. Above the level of glial adhesions—i.e., in D1 and lower cervical segments—there was a single cavity along the line of one dorsal horn, with a very densely gliotic wall. Fairly complete degeneration of columns of Goll at this level.

Region of pyramidal tract on side of cavity also degenerated; cavity ran up as high as C5, where it occupied only posterior half of horn. Pyramidal tract only slightly paler than rest of cord at this level.

Degeneration of dorsal columns in upper thoracic and cervical regions much less complete on side of cavity in dorsal horn than on opposite side.

Case 4.—A woman, aged 25, had been admitted to St. Bartholomew's Hospital, under Dr. Hinds Howell, with cerebrospinal fever on May 14, 1935. At that time the patient's C.S.F. had been under high pressure, and had contained over 20,000 polymorphs per c.mm. and intracellular and extracellular gram-negative diplococci.

The patient had been treated with intrathecal antimeningococcal serum and repeated lumbar and cisternal punctures. She had remained febrile for 24 days; and, after her temperature had finally settled down, severe headache and vomiting had recurred, and lumbar and cisternal punctures had suggested a block above the foramen magnum.

On June 29, 1935, the right lateral ventricle had been punctured and 40 ml. of C.S.F. removed.

After this there had been progressive improvement, and on Aug. 13, 1935, she had been discharged symptom-free.

In the latter part of 1943 she had noted some weakness and stiffness of the left leg, which dragged a little when she walked, and during the next year she had developed sensations of discomfort and tightness round the lower ribs on both sides: she had also had some urgency of micturition.

She was readmitted to St. Bartholomew's Hospital, under my care, on Oct. 16, 1946.

On Examination.—Left leg showed increase of extensor tone, with slightly diminished power, weakness being greatest in dorsiflexion of ankle; no spasticity or weakness of right leg. Both knee-jerks abnormally brisk; right ankle-jerk present; left ankle-jerk absent; right plantar response flexor and left plantar response extensor.

Sensation: a band of impaired cutaneous sensation on both sides from D6 to D8 segments; no cutaneous impairment in legs; position and vibration sense normal.

On walking there was slight dragging of left leg. Radiography of spinal column showed no abnormality.

Lumbar puncture: in initial pressure 180 mm., with normal rise on jugular compression and free fall on jugular release: protein content 30 mg. per 100 ml.; 2 cells per c.mm.

Wassermann reaction negative in blood and C.S.F.

Post-meningitic adhesive arachnoiditis was diagnosed; but, as the disability was slight and the patient was not keen on further investigation, no myelogram was made, and she is being watched as an outpatient.

Clinical Picture

In portraying the clinical picture my 2 cases, together with those previously recorded—except that of Hobhouse (1897), where the diagnosis is in some doubt—have been considered, making a total of 13 cases. The youngest patient was aged between 9 and 10 years when the spinal symptoms started, and the oldest 37.

Diffuse arachnoiditis can follow benign lymphocytic choriomeningitis (Barker and Ford 1937) and can also develop without a previous meningeal infection (Elkington 1936), but in 9 of these 13 cases there was bacteriological evidence of the acute illness being meningococcal meningitis, and in the remaining 4 a clinical picture of acute meningitis, with a considerable number of polymorphs in the C.S.F., left little doubt that in them also there had been meningococcal meningitis. Intrathecal serum is known to have been given in 3 cases and not given in 3, but in the remaining 7 cases it is not known whether it was given or not. In no case was there intrathecal injection of sulphapyridine, which is known to cause lesions of the cauda equina through its alkaline reaction (Hunter 1940).

The *time of onset* of symptoms of a spinal lesion has varied from four weeks to seven years after the acute illness, the most frequent time being from four to six months, and in most cases there has been slowly progressive impairment of spinal-cord function, but in the patient of Barré et al. (1925) there were two remissions almost to normal before a progressive paraparesis supervened.

Pain of root type and *girdle sensations* have only been prominent in 4 cases—an unexpected finding when the extensive involvement of the posterior roots in the arachnoiditis is considered.

The clinical picture in the developed disease is that of a progressive spastic paraparesis or tetraparesis, depending on the upper level of the spinal lesion, and in many of the cases sphincter control was affected. The upper level of the lesion, as determined clinically by myelogram or by operation, varied from C5 segment to D10.

Sensation is usually impaired, the commonest finding being a rather diffuse upper level with all types of sensation impaired below it, but in the case of Barré et al. (1925) and in my case 3 sensation was impaired on the trunk, with minimal impairment on the legs, such as is usually associated with an intramedullary lesion. Lejonne and Rose (1909) considered that their patient had a "central myelitis" because of the dissociated type of impairment of sensation.

Lumbar puncture gave manometric findings and protein content similar to those found in subarachnoid block,

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and in only 1 case (Selinsky 1935) was there an increase of cells—15 per c.mm. In 2 cases lumbar puncture could not be done, and this may have been due to obliteration of the lumbar subarachnoid space by arachnoiditis.

Myelograms have shown either a complete holdup of the iodised oil (4 cases) or a partial holdup, with droplets of oil at several different levels (4 cases), a finding considered to be characteristic of diffuse arachnoiditis. When a progressive spinal-cord syndrome develops at any period after an attack of cerebrospinal fever, the possibility of diffuse spinal arachnoiditis must be entertained and the case investigated by lumbar puncture and, if this gives any evidence of spinal block, by myelography.

Treatment

Of the 13 cases 6 have been submitted to operation. Of the remaining 7 patients 1 died suddenly a few hours after a cisternal myelogram (Divry and Lecomte 1930) and necropsy showed a diffuse arachnoiditis, with the arachnoid intimately adherent to the spinal cord; 1 patient is said to have shown considerable improvement after cisternal injection of lipiodol (Guillain and Sigwald 1932, case 2) and to have been walking well six months after the myelogram, which showed a block at C4 vertebra; 1 patient is said to have improved slightly after lipiodol injection (Stroe et al. 1935) but was not followed up; 1 patient (Lejonne and Rose 1909) improved gradually in hospital without specific therapy; and my case 4 has shown some improvement with walking exercises, but the follow-up has lasted only a few months, and operative treatment may still be needed. No details about the eventual outcome are available for the 2 other cases (Simonin 1911, Guillain and Sigwald 1932, case 1).

In 6 cases laminectomy has been performed, and usually an attempt has been made to separate the arachnoid adhesions from the spinal cord. In case 3 death followed operation, and it was clear at necropsy that it was impossible to separate the adhesions from the cord without damaging it, and that cavities had formed in the medulla. In 1 case (Bériel and Devic 1928) nothing was done at operation beyond opening the dura and there was no clinical improvement five months later. In 1 case (Barré et al. 1925), a cystic arachnoiditis with adhesions to the cord, a cyst was opened and some of the adhesions were separated; but there was no improvement, and the patient's legs were weaker four months after operation than they had been before it. In 1 case (Selinsky 1935), after the dura had been opened, the spinal cord was hidden by a greyish-yellow thickened arachnoid intimately adherent to the cord. After operation this patient was given deep X-ray therapy and there was gradual improvement, both motor and sensory, but some months after operation he was still unable to walk. In 2 cases considerable improvement has followed operation. In Batten's (1916) patient there was some opacity and thickening of the arachnoid at D3 level, and there was progressive increase of power in the legs following operation. Operation in Stewart's (1945) case disclosed arachnoid adherent to the pia without definite cyst formation; adhesions between dura and arachnoid were separated by blunt dissection; and, when this had been done, the posterior aspect of the cord appeared pale. It does not, however, appear from the description of the operation that there were adhesions actually involving the spinal cord. In this case a most satisfactory result was obtained. Improvement did not begin for about eighteen months, but after that it was progressive; and, when the patient was examined three and a half years after operation, no abnormal neurological signs were found, and she could walk three miles, whereas before operation she had been unable to stand.

It seems that, in the presence of a progressive paraparesis with myelographic evidence of a spinal block, laminectomy should be carried out in these cases; but, if there are extensive adhesions involving the spinal cord, little good will result from attempts to separate them. When, however, the cord is not involved in the adhesions, there is some hope of improvement following blunt dissection.

Pathology

In 2 cases necropsies were performed: my case 3 and the patient of Divry and Lecomte (1930) who died after myelography. Further, in Selinsky's (1935) case sections of the arachnoid excised at operation were examined. In all 3 cases the arachnoid showed signs of chronic inflammation, with infiltration of lymphocytes, and in the 2 cases in which the spinal cord was examined there were intramedullary changes: in my case 3 cavity formation which would explain the intramedullary type of cutaneous impairment of sensation in the patient; and in Divry and Lecomte's (1930) case the white matter showed diffuse change, with disappearance of myelin and change in the axis-cylinders, most marked in the posterior columns, and no abnormality was apparent in the grey matter. In this latter case the symptoms of a spinal lesion had come on within a few weeks of the acute attack of cerebrospinal fever. The spinal cord does not appear to be compressed in the sense that it is by a neoplasm; it is constricted or strangulated by the thickened arachnoid, and it seems highly probable that its blood-supply is interfered with in a similar manner, and that this interference is the cause of the intramedullary cavitation. The pathogeny of cavitation within the cord is still in some respects uncertain, but there is suggestive evidence that it may be due to impaired blood-supply (Thomas and Hauser 1904, Klatz 1913, Russell 1932).

In this connexion a case described by Guillain et al. (1939) is of interest. A girl had had cerebrospinal fever at the age of 18 and had been treated with intrathecal serum. She had made a good recovery, but eight months later she developed in her left hand weakness, wasting, and sensory changes, which slowly progressed. At the age of 41 she was examined by the authors and was found to be a typical case of syringomyelia and syringobulbia. Queckenstedt's test gave no evidence of spinal block, and the C.S.F. was normal. Though it is possible that this was a coincidental development of syringomyelia, the authors thought that it might be secondary to fibrous organisation of the meninges resulting from the cerebrospinal fever. The cavitation in the cord in my case 3 confirms the probability of this hypothesis.

SUMMARY

Spinal-cord lesions may develop in cerebrospinal fever, either during the acute illness or later.

During the acute illness an acute transverse myelitis may develop, or the clinical picture may resemble that of anterior poliomyelitis, presumably due to a lesion of the anterior-horn cells—the poliomyelitic type of cerebrospinal fever.

Delayed symptoms of a spinal-cord lesion are due to a diffuse adhesive arachnoiditis which constricts the spinal cord and may produce extensive intramedullary changes.

The clinical picture, treatment, and pathology of these complications of cerebrospinal fever are discussed, and 4 cases described.

My thanks are due to Dr. Macdonald Critchley, Mr. Harvey Jackson, and the medical committee of the National Hospital, Queen Square, for permission to use the case-records of case 3.

REFERENCES

Ballard, S. I., Miller, H. G. (1945) *Lancet*, ii, 273.
Banks, H. S., McCartney, J. E. (1942) *Ibid*, i, 219.
Barker, L. P., Ford, F. R. (1937) *J. Amer. med. Ass.* **109**, 785.
Barré, J. A., Leriche, R., Morin, P. (1925) *Rev. neurol.* **32**, 604.
Batten, F. E. (1916) *Proc. R. Soc. Med.* (Sect. Neurol.) **9**, 63.
Beeson, P. B., Westerman, E. (1943) *Brit. med. J.* i, 497.
Bériel, L., Devic, A. (1928) *Lyon méd.* **141**, 102.
Borovsky, M. P. (1939) *Amer. J. med. Sci.* **179**, 82.

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NECROBACILLOSIS

REPORT OF TWO CASES

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CONSIDERABLE attention has been drawn of recent years to infections with *Bact. necrophorum* (necrobacillus). Beveridge (1934) showed that *Bact. necrophorum* occurs in the healthy mouth and gut. Other authorities (Harris and Brown 1927, Forbes and Goligher 1944, Chandler and Breaks 1941, Dragstedt et al. 1941, Jones 1944, *Lancet* 1944) indicate a variety of lesions leading on to systemic infection with this organism; fauces, tonsils, mastoid, uterus, and appendix have all been incriminated. In other cases septicæmia has followed osteomyelitis and gunshot wounds.

CASE-RECORDS

Case 1.—A previously healthy soldier, aged 38, was admitted to an emergency hospital on Aug. 3, 1945, six months after his return to this country from the Middle East. On the previous evening he had gone to bed with a headache after a dance. This he attributed to too much alcohol, but next morning his headache was worse and accompanied by malaise and vomiting. On admission his temperature was 100·6°F, but nothing abnormal was found.

Next day he had a rigor, and his spleen was just palpable. His general condition was worsening and there was evidence of heart-failure. His cerebrospinal fluid was normal, and no malarial parasites were found in peripheral blood smears, but malignant malaria was suspected, and quinine was given. The first few doses were vomited, but on Aug. 6 the patient retained the drug, his temperature returned to normal (see figure), and his general condition began to improve.

On Aug. 10 the quinine was discontinued and mepacrine substituted. The patient again became pyrexial and had a rigor every day. Smears were examined daily for parasites, with negative results. Aerobic blood-cultures were negative, and the white-cell count, which on Aug. 8 was 13,000 per c.mm., had risen by Aug. 14 to 42,000 per c.mm. Blood-urea was 150 mg. per 100 ml., and urinary output poor. In view of the leucocytosis a course of penicillin was begun on Aug. 15, with a daily dosage of 120,000 units until 840,000 units had been given. By Aug. 18 the patient was moribund.

His condition up to then could not be explained entirely by malaria, but in view of the possibility of a double pathology and because mepacrine was not being excreted in the urine, intravenous quinine was given, with sudden and dramatic improvement.

A week later the patient appeared to be recovering rapidly and was asking to get up. His white-cell count had now fallen to 14,000 per c.mm., the blood-urea to 37 mg. per 100 ml., and the heart-failure had cleared. Sternal puncture showed no abnormality.

This improvement, however, was short-lived, and during the last few days of August a quotidian remittent fever developed. Rigors, followed by considerable collapse, occurred almost daily. There was also a return of heart-failure, with oliguria and nitrogen retention.

Malaria had by now been excluded; and, though the clinical picture suggested an overwhelming blood infection, aerobic cultures were negative, and a second course of 960,000 units of penicillin had been ineffective. At this point an infection with *Bact. necrophorum* was considered, and on Sept. 6 anaerobic blood-cultures revealed gram-negative organisms.

Meanwhile the patient continued to go downhill, and became increasingly anæmic. On Sept. 10 there was clinical evidence of a right basal pneumonia. On the only two occasions on which sputum was obtained anaerobic culture was negative.

A few days later a small right basal effusion developed, and the pneumonic process spread to the left base. His chief complaint at this time was a severe pain in the right scapular region. This did not appear to be pleuritic, but no other cause was found until Sept. 27, when there was evidence of an abscess which on incision was found lying chiefly deep to the scapula and containing 5 oz. of thick offensive pus. Smears revealed the same organism as that obtained from the blood-culture.

He died on Oct. 1, by which time the organisms had been identified as belonging to the fusiform group, and death was certified as due to necrobacillosis.

Necropsy Findings.—The skin and conjunctivæ were faintly but definitely jaundiced. There was an early fibrinous pericarditis. The left pleural cavity showed only early inflammatory change, but on the right side there was thickening of the membrane, chiefly parietal, with massive fibrinous deposits and about 2 pints of lumpy pus. This empyema did not communicate with the subscapular abscess. The right lung was collapsed but contained few abscesses. The left lung had abundant miliary and several larger abscesses, distributed (rather more thickly) in the subpleural zone.

The liver contained a single abscess, $1^1/_2$ in. in diameter, under and adherent to the diaphragm, and one kidney contained a minute abscess.

No focus of infection or portal of entry was found in teeth, fauces, bones, or skin.

Bacteriology.—Cultures, obtained first from the blood and later from pus, gave colonies which at two days were about 1 mm. in diameter, translucent and smooth, but not shiny. At four days the colonies were about 3 mm. in diameter, with a flattened spreading peripheral zone round a central umbo, and they lost some of their translucency and became more matt-surfaced. Beta-hæmolysis appeared within two days, and a zone of alpha-hæmolysis and darkening beyond this after about four days. The colony size was subject to variation which was inconstant on subculture and not related to microscopical morphology. Anaerobic penicillin-plate cultures gave zones of inhibited growth approximately comparable with those of the standard Oxford staphylococcus.

Cultivation required strict anaerobic conditions—only Franklin's (1933) cases among those reported appear to be due to an organism culturable aerobically—and enrichment of the medium, growing freely at first on blood or serum agar and in blood broth. It proved also possible to grow it in Robertson's meat medium with less profuse growth but increased viability.

Microscopy of pus obtained late in the disease showed the organism to be a poorly stained gram-negative rod resembling *Bact. coli*, but films from cultures revealed it as being extremely pleomorphic. Both in solid and liquid media it produced very long filaments growing in tangled masses. Definite branching was thought not to be present.

Older cultures also showed numerous clubbed forms and even detached spherical forms, described by Lemierre (1936) and others as a feature of the so-called *B. funduliformis*, together with masses of amorphous material that appeared to be broken down bacterial substance.

Cultivation soon also showed that the viability of the organisms was exceptionally low. Its life in pus at room temperature was about six weeks, but on artificial media not

DR. ALDREN TURNER: REFERENCES—*continued*

De Massary, E., Chatelin (1910) *Rev. neurol.* **19**, 613.
Degen, J. A. jun. (1945) *Brit. med. J.* ii, 243.
Divry, P., Lecomte (1930) *J. Neurol., Brux.* **30**, 284.
Dopter, C. H. A. (1921) L'infection meningococcique. Paris.
Elkington, J. St. C. (1936) *Brain*, **59**, 181.
Farmer, T. W. (1945) *Arch. intern. Med.* **76**, 201.
Gowers, W. R. (1893) A Manual of Diseases of the Nervous System. London.
Guillain, G., Mollaret, P., Delay, J. (1939) *Bull. Soc. méd. Hôp. Paris*, **55**, 566.
— Sigwald, J. (1932) *Rev. neurol.* **39**, 516.
Hobhouse, E. (1897) *Lancet*, ii, 1185.
Hunter, M. (1940) *Ibid*, ii, 470.
Klatz, O. (1913) *Amer. J. med. Sci.* **146**, 681.
Lejonne, P., Rose, F. (1909) *Bull. Soc. méd. Hôp. Paris*, **28**, 23.
Pai, M. N. (1945) *Brit. med. J.* i, 289.
— (1946) *J. ment. Sci.* **92**, 389.
Raymond and Sicard (1902) cited by Sicard and Foix (1910).
Ribadeau-Dumas, L., Siguier, M., Gharib, M. (1937) *Nourrisson*, **25**, 153.
— — — (1938) *Prat. méd. franç.* **19**, 35.
Rolleston, H. D. (1919) Lumleian Lectures on Cerebro-spinal Fever. London.
Russell, D. S. (1932) *J. Path. Bact.* **35**, 103.
Selinsky, A. (1935) *J. Mt Sinai Hosp.* **1**, 84.
Sicard and Foix (1910) *Rev. neurol.* **18**, 733.
Simonin, D. (1911) *Paris méd.* **1**, 595.
Smithburn, K. C., Kempf, G. F., Zerfas, L. G., Gilman, L. H. (1930) *J. Amer. med. Ass.* **95**, 776.
Sophian, A. (1913) Epidemic Cerebrospinal Meningitis. London.
Stewart, H. H. (1945) *Brit. med. J.* ii, 319.
Stroe, A., Dragancsco, S., Bruckner, I., Banu, E. (1935) *Rev. neurol.* **63**, 984.
Thomas, A., Hauser, G. (1904) *Nouv. Iconogr. Salpêt.* **17**, 376.
Wilkins, L. (1925) *Amer. J. Dis. Child.* **29**, 67.
Worster-Drought, C. C. (1918) *Lancet*, ii, 39.
— Kennedy, A. M. (1919) Cerebro-spinal Fever. London.

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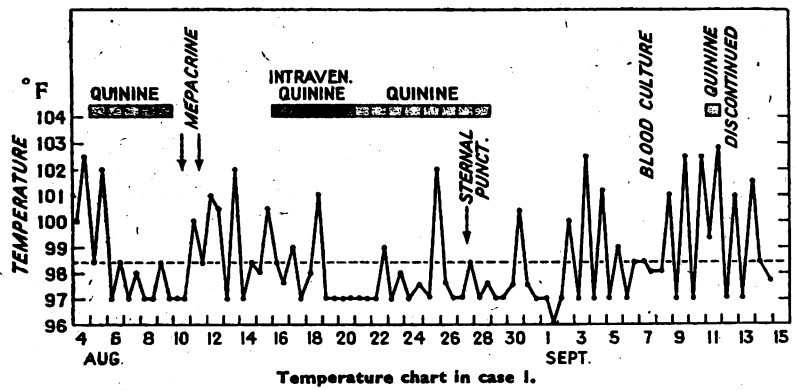

Temperature chart in case 1.

more than about a week, and subcultures at shorter intervals died out in about two months. In serum-sugar broths it feebly fermented lactose, glucose, mannite, saccharose, and dulcite, *without gas formation*, and formed indole. Cultures had a distinctly unpleasant smell but not strong enough to merit the term foul.

Successful inoculations gave the following results. Subcutaneous inoculation in the guineapig gave, after a week, an abscess with cheesy contents which grew the organism. Intraperitoneal inoculation in a guineapig gave, after a fortnight, a suppurating mesenteric gland from which again the organism was grown. A rabbit intravenously inoculated appeared to remain well until it died suddenly in the third week; at necropsy the organism was cultivated from an abscess in the liver, which was the only lesion found. Mice, intraperitoneally inoculated, died speedily within thirty-six hours, with a general "rotting" of all the abdominal organs.

Case 2.—A man, aged 25, had had chronic suppurative otitis media from childhood, with intermittent discharge from the ear. The current discharge had ceased two days before admission, malaise and shivering supervening.

On admission to the Blackburn Royal Infirmary he was comatose and vomiting, with well-marked neck rigidity, and shortly afterwards began having fits. Fluid from lumbar puncture contained much pus and normal chlorides; but no organism was detected either in smears or in cultures.

Operation (Mr. J. M. Wishart, F.R.C.S.).—Cerebral abscess located and 5 ml. of foul pus withdrawn. Three calcium-penicillin tablets (10,000 units each) inserted into brain cavity, and wound drained.

Sodium penicillin 30,000 units three-hourly given systemically to a total of 1·45 mega units, and sulphamezathine 1 g. four-hourly. The patient made a remarkable and rapid recovery from his original grave condition and was discharged from hospital after three weeks.

Pathology.—Aerobic culture was entirely negative. In the anaerobic tin, which furnishes a high degree of microaerophilia rather than absolute anaerobiosis, the organism grew fairly freely at first, better on blood-enriched agar than plain nutrient agar, giving small discrete smooth colourless colonies, without hæmolysis.

The original culture, which included some secondary invading organisms, yielded a better growth of this necrobacillus than did pure subcultures; it was thought the presence of other organisms improved its growth. The observation of improved growth in symbiosis has been made on *Bact. necrophorum* (Beveridge 1934) and *Actinomyces bovis*.

Microscopically the organism showed itself, especially in older cultures, to be a highly pleomorphic gram-negative bacillus; it was often filamentous, but thought not to show definite branching; it very easily formed beaded and giant clubbed and spherical forms. It did not survive more than four subcultures in about ten days, which hindered further observations.

Mouse and rabbit inoculations gave no result, the inoculated suspension being probably, if not dead, already moribund. The sensitivity of the organism on plate cultures to penicillin seemed to be about the same as that of the Oxford *Staph. pyogenes*.

DISCUSSION

From the point of view of clinical pathology it was of interest that, though case 1 presented a very high leucocytosis, with other clinical evidences of a septicæmia, repeated blood-cultures were negative. When further cultures were treated anaerobically, a growth was obtained of an organism answering to the necrophorus group (fusiformis of Topley and Wilson). Precise identification is probably impossible in the present incomplete and confused state of our knowledge of this group.

The important differential diagnosis in case 1 was malaria, in view of his service abroad; and, despite leucocytosis and negative smears, this diagnosis was supported by the repeated partial response to empirical malarial therapy and by the repeated negative blood-cultures. So case 1 strongly emphasises the importance of anaerobic as well as aerobic culture, and of sternal marrow puncture in obscure pyrexia. The clinical features of infection with organisms of this group are usually those of suppurative or necrotic local infection, often mouth or middle ear (Lemierre 1936, Franklin 1933, our case 2), less commonly uterus (Jones 1944), lung (Lemierre 1936), appendix (Veillon and Zuber, cited by Wilson and Miles 1946), osteomyelitis (Chandler and Breaks 1941), and septic wounds (Forbes and Goligher 1944). Generalised blood-stream infection, or a suppurating phlebitis, may be a further development, but case 1 seems exceptional in being a primary necrobacillus septicæmia without a detectable focus or portal of entry. Necrobacillosis is always accompanied by a well-marked granulocytic reaction.

The therapeutic problems involved appear to be simplified by the finding of penicillin-sensitivity in both strains. In case 1 we were too late; abscess formation had already begun in inaccessible sites; we believe that adequate penicillin dosage in the early stage would have controlled the infection. In case 2 penicillin was inserted directly into the infected cavity; we believe that this, and not the systemic penicillin or the systemic sulphonamide, was the effective agent. This view is supported by the general finding of infective vascular occlusion in localised lesions, leading to tissue necrosis and preventing blood-borne antibiotics from reaching the site. We have not been able to test the sensitivity of either strain in vitro to sulphonamides.

SUMMARY

Two cases of infection with necrobacillus are reported: the first a primary generalised septicæmia which was fatal; the second a brain abscess secondary to chronic otitis, treated locally with penicillin and followed by recovery.

The discussion of these cases emphasises routine anaerobic culture; keeping this group of infections in mind in obscure pyrexias and local abscess formation; and the value of penicillin therapy.

We wish to thank Dr. R. W. Fairbrother, of Manchester Royal Infirmary, for help in studying these organisms and giving us some references; Mr. M. H. Sephton, F.I.M.L.T., for valuable technical assistance; the Principal Medical Officer, Ministry of Pensions, for allowing us to retain the clinical documents during the preparation of this article; and the Director-General, Emergency Medical Services, for permission to publish case 1, and Mr. J. M. Wishart, F.R.C.S., for permission to publish case 2.

REFERENCES

Beveridge, W. I. B. (1934) *J. Path. Bact.* **38**, 467.
Chandler, F. A., Breaks, V. M. (1941) *J. Amer. med. Ass.* **116**, 2390.
Dragstedt, L. R., Dack, G. M., Kirsner, J. B. (1941) *Ann. Surg.* **114**, 653.
Forbes, G. B., Goligher, J. C. (1944) *Lancet*, i, 399.
Franklin, A. W. (1933) *Ibid*, ii, 645.
Harris, J. W., Brown, J. H. (1927) *Bull. Johns Hopk. Hosp.* **40**, 203.
Jones, H. P. (1944) *Lancet*, ii, 824.
Lancet (1944) i, 409.
Lemierre, A. (1936) *Ibid*, i, 701.
Wilson, G. S., Miles, A. A. (1946) Topley and Wilson's Principles of Bacteriology and Immunity. 3rd ed., London.

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RECOVERY OF STREPTOMYCIN FROM URINE

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IN the treatment of tuberculous patients with streptomycin experience has shown that at least 50% of the drug is excreted in the urine at a concentration of about 1000 units per ml. This is in excess of the reported [1] levels of 200–400 units per ml. produced in culture filtrates during the large-scale manufacture of streptomycin. In view of the great shortage of streptomycin it seems desirable to recover these large quantities of the drug, which are at present being discarded.

METHOD

The method of recovery which we have used is essentially that of Vander Brook et al.[2] Only the times of the various operations have been modified.

To 10 litres of urine, adjusted to pH 2·0 with 50% H_2SO_4, 200 g. of Sutcliffe-Speakman No. 5 charcoal was added and the mixture stirred for 10 minutes. It was then filtered at the pump, using powdered kieselguhr as a filter aid. The filtrate, a clear colourless liquid which contained most of the streptomycin, was adjusted to pH 7·0 with 50% NaOH solution, and 660 g. of Sutcliffe-Speakman charcoal was stirred in. The stirring was continued for 30 minutes, during which time the streptomycin was completely adsorbed on the charcoal. The charcoal was filtered as before and suspended in 1500 ml. of 10% acetone, which was then adjusted to pH 2·5 with 50% H_2SO_4. The suspension was stirred occasionally for 4 hours and filtered, and the elution was repeated in exactly the same way. The eluates were combined and poured with vigorous stirring into 9000 ml. of acetone. A white flocculent precipitate of impure streptomycin sulphate was formed, and after this had been left overnight in the refrigerator it was separated by decantation and filtration at the pump. It was then treated with 40 ml. of distilled water and the insoluble material filtered off. The filtrate was adjusted to pH 7·0 with 10% NaOH solution and the slight amount of precipitate formed was removed by filtration through a 0·9 μ gradocol membrane which simultaneously sterilised the solution. It was then freeze-dried aseptically in serum vials. The streptomycin sulphate which was obtained was a white solid of potency 500,000–700,000 units per g.

Since each batch of activated charcoal varies in its adsorptive powers it is necessary to determine on the small scale the minimum amount of the particular charcoal needed to adsorb all the streptomycin from a given amount of the pretreated urine, and to use this amount in the large-scale recovery.

The table shows the results of four recovery experiments in which streptomycin assays were carried out after each operation. The assays were done by serial dilution using Friedlander's bacillus as a test organism. A pure streptomycin standard was included with each set of assays. In batches I–III only two elutions were made; in batch IV a third elution removed only half as much streptomycin as the previous one.

Messrs. Glaxo Laboratories Ltd. kindly offered to test the pharmacological properties of a representative sample of the streptomycin sulphate obtained. They declared that the sample satisfied the F.D.A. requirements for toxicity, pyrogens, and histamine-like substances.

The sulphate content of the recovered material was fairly constantly 34% by weight; about 14% of this, therefore, must be impurity.

1. Woodthorpe, J. J., Ireland, D. M. *J. gen. Microbiol.* 1947; **1**, 344.
2. Vander Brook, M. J., Wick, A. N., De Vries, W. H., Harris, R., Cartland, G. F. *J. biol. Chem.* 1946, **165**, 463.

RESULTS OF FOUR RECOVERY EXPERIMENTS

Material assayed	Batch I	Batch II	Batch III	Batch IV
Crude urine	10 litres at 645 u./ml. (6,450,000 u.)	10 litres at 735 u./ml. (7,350,000 u.)	10 litres at 760 u./ml. (7,600,000 u.)	11 litres at 900 u./ml. (9,900,000 u.)
Pre-treated urine	10 litres at 625 u./ml. (6,250,000 u.)	10 litres at 735 u./ml. (7,350,000 u.)	10 litres at 632 u./ml. (6,320,000 u.)	11 litres at 870 u./ml. (9,570,000 u.)
Urine after adsorption	Nil	Nil	Nil	Nil
1st eluate	1500 ml. at 1100 u./ml. (1,650,000 u.)	1500 ml. at 1280 u./ml. (2,220,000 u.)	1500 ml. at* 870 u./ml. (1,305,000 u.)	1500 ml. at* 1080 u./ml. (1,620,000 u.)
2nd eluate	1500 ml. at 1100 u./ml. (1,650,000 u.)	1500 ml. at 1000 u./ml. (1,500,000 u.)	1500 ml. at* 830 u./ml. (1,245,000 u.)	1500 ml. at* 1080 u./ml. (1,620,000 u.)
3rd eluate	..	..	..	1500 ml. at* 512 u./ml. (768,000 u.)
Concentrate before freeze-drying	40 ml. at 87,000 u./ml. (3,480,000 u.)	25 ml. at 156,000 u./ml. (3,900,000 u.)	25 ml. at 118,000 u./ml. (2,950,000 u.)	40 ml. at 100,000 u./ml. (4,000,000 u.)
Freeze-dried solid:	5·0 g.	7·0 g.	6·5 g.	5·0 g.
Recovery	56%	55%	47%	42%
Potency	600,000 u./g.	500,000 u./g.	450,000 u./g.	700,000 u./g.

* Eluted overnight.

SUMMARY

By the use of known simple adsorption methods streptomycin in the urine of tuberculous patients can be recovered in 50–60% yield in a form suitable for reinjection.

We desire to thank Mr. Lester Smith, D.SC., of Glaxo Laboratories Ltd., for helpful suggestions; Mr. G. F. Somers, of Glaxo Laboratories Ltd., for the pharmacological tests; and Dr. G. W. S. Andrews, of this institute, for the bacteriological tests.

CARCINOID CAUSING OBSTRUCTION

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CARCINOID or argentaffine tumours of the intestine are comparatively rare, receiving scanty mention in most textbooks. Probably not more than 400 cases have so far been described, and the diagnosis seems never to have been made before operation. The following case is therefore thought worthy of record.

A single woman, aged 61, was admitted to hospital on Oct. 9, 1944, with abdominal pain, vomiting, and constipation. The appendix had been removed twenty years before; there was no other relevant past history. Six months before admission she had an attack of colicky abdominal pain, without vomiting or diarrhœa, diagnosed as enteritis. This cleared up with dietary treatment, but she remained listless. Two months before admission a barium enema was reported as normal. A fortnight later the pain recurred, was diagnosed as gastritis and was again treated by diet. The patient again improved, but relapsed two weeks before admission.

When admitted she had had no bowel action for ten days, she had vomited twice a day for six days, and had passed no flatus for two days. Three enemata had produced no result. Attacks of colic came on every four hours and lasted two hours; they started on the right and travelled down the centre of the abdomen. She complained of excessive audible abdominal gurgling. The last stool passed had been normal; micturition was normal. She had lost 2 stone in the last six months.

Examination showed a wasted slightly dehydrated woman; temperature 99·8°F, pulse-rate 120, tongue dirty, breath foul. Abdomen soft, distended, tympanitic, without free fluid or visible peristalsis. A tender mass about 5 in. in diameter was clearly palpable in the right iliac fossa. Per rectum a tender coil of gut was felt high up on the right. The provisional

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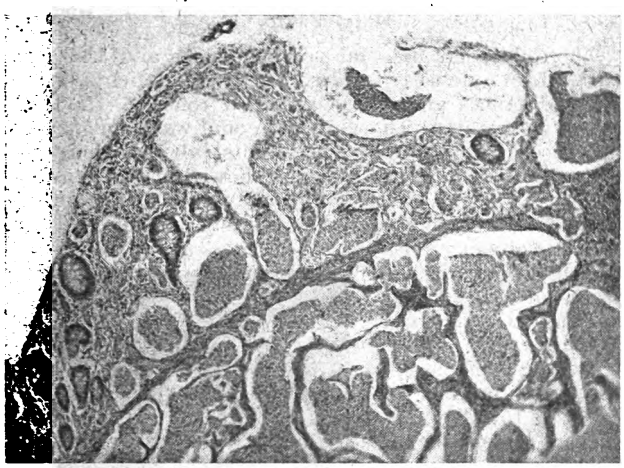

Fig. 1—Carcinoid of large gut. (× 53.)

diagnosis was chronic obstruction due to carcinoma of the colon. A flatus tube was passed with some effect, but further enemas produced no fæcal result. It was decided to carry out further investigations, as she appeared to be improving.

Radiography on Oct. 11 showed large dilated loops of gut, but did not show the site of obstruction. On the 12th a barium enema was given, with the following result (report of Dr. L. G. Blair):

> "There is a dilated coil of small gut. There is no lesion in the transverse, descending, or sigmoid colon. There was a palpable tumour at the start of the examination in the region of the cæcum. Barium filled out this area with difficulty, and it again appeared reasonably normal. At this stage I was not able to palpate any tumour, and think it possible that I reduced or partially reduced a chronic intussusception. Film after evacuation shows a filling defect in the cæcum which is not typical of carcinoma, and I think possibly intussusception is recurring. I could not then, however, palpate the very definite tumour which was present at the start of the examination."

On the 13th the tumour was no longer palpable. On the 14th severe diarrhœa began, lasting three days. On the first day 12 stools were passed, which appeared soft but otherwise normal. Four pints of intravenous fluid was required besides copious fluids by mouth to counteract dehydration. On the 20th a laparotomy was performed by Mr. David Levi. The lower small gut was found to be dilated and hypertrophied up to the ileocæcal valve. A growth was felt on the cæcum and was thought to confirm the provisional diagnosis. An ileotransverse anastomosis was made and the abdomen closed. The patient made excellent progress after this, and on Nov. 10 Mr. Levi did a partial colectomy. The cæcum was freed from numerous adhesions, and a chain of enlarged firm mesenteric glands was seen, associated with a large hard growth at the ileocæcal junction. Since we considered this to be a carcinoma, we felt inclined to abandon the operation as hopeless, but finally decided to proceed, as it seemed possible to remove all the glands we could see and an anastomosis was already present. The terminal ileum, cæcum, ascending colon, and the first few inches of transverse colon were accordingly removed with a wedge-shaped portion of mesentery containing all the glands. A blood-transfusion was given after the operation and the patient made an excellent recovery. On Jan. 25, 1948, she wrote: "I can do a good eight hours' housework every day and take six-mile walks. My health is better than ever. My inside works like clockwork."

Our prognosis was not favourable until the pathological report was received from Dr. D. M. Pryce, as follows:

An ileocolic resection comprising 13 cm. of small gut and 11·5 cm. of large gut. The appendix had been previously excised and was represented only by a filiform stump. There was some omentum adherent to the large gut. The final 3 cm. of ileum was narrowed. The lumen in the proximal 1 cm. of this part was further reduced by a small tumour (1·5 × 1 × 0·5 c.cm.) to 2 cm. in circumference (1 cm. being surface of tumour and 1 cm. longitudinally folded mucosa). There was a separate smaller nodule of growth (0·4 cm. in diameter) a little nearer the ileocæcal opening, and a very small nodule (0·3 cm. in diameter) of growth in the mucosa of the large gut a little above the ileocæcal valve. The larger nodule of growth was situated on the mesenteric side of the gut, and its deep surface abutted against the muscularis, which in this situation was fibrosed. Immediately outside this there was an indurated mass of growth (2 × 1 × 2·5 c.cm.) in the ileocæcal angle. This was in and about lymph-glands, but there were some lymph-glands without growth. This mass was fixed to the ascending colon immediately above the ileocæcal opening.

On section the growth was bright yellow and associated with dense fibrosis. Owing to the fibrosis the cæcum was tucked up somewhat behind the ileocæcal opening, which was œdematous and pouting. Sections of all the nodules and of the mass show the typical appearances of argentaffine carcinoid tumour (figs. 1 and 2), both with the routine and the special silver stains. These appearances have been several times described adequately in published work. The muscularis of the small gut was hypertrophied (4·5 mm. thick). Above the growth the lumen was dilated (up to 6 cm. in circumference) except for a stenosis, not due to growth, about 5 cm. from the cut end. In places the mucosa was greatly swollen from chronic inflammatory œdema; and in places there were some points of ulceration.

It is not known whether the excised appendix contained growth. In the absence of any information regarding this it is not possible to say which was the primary focus. The mass of growth in the ileocæcal angle may equally well have been a recurrence of growth after removal of the appendix; or an extension from the larger nodule in the lower ileum.

DISCUSSION

Carcinoid tumours were first described by Lubarsch (1888) and were more intensively studied by Oberndorfer (1907), who suggested the name. The pathogenesis has given rise to considerable discussion, as has also their degree of malignancy. These subjects have been reviewed by Latimer (1941), Potter and Docter (1944), Cooke (1931), Raiford (1933), Forbus (1925), and Selberg (1940). Of these tumours 85% develop in the ileocæcal region, and in Cooke's series 17·4% produced symptoms of obstruction, the incidence of which is placed much lower by most other writers. Most of the tumours develop on the appendix and are symptomless, though often associated with acute appendicitis.

Cases similar to the present one have been reported. Dangremond (1942) records a death from obstruction

Fig. 2—Carcinoid of small gut. (× 53.)

because the tumour was thought at laparotomy to be hopelessly inoperable. Ariel (1939) records 4 cases of obstruction, in 3 of which there were metastases. In one of these an ileocolic intussusception was found and easily reduced at operation, when the tumour appeared on the terminal part of the ileum.

Wengen's (1941) series of 18 cases contains one of particular interest with regard to prognosis. Here obstruction was present at the ileocæcal junction, and an ileotransverse anastomosis was performed. The

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tumour, with many metastases, was left behind and regarded as inoperable. Ten years later the patient died from intercurrent disease, and autopsy showed that no further tumour growth had taken place since the operation. Mallory (1936) also reported a case in which a carcinoid was incompletely excised, a metastatic growth being left, and the patient died fifteen years later; autopsy showed only the metastasis left behind, but no further growth. It therefore seems reasonable to accept the view of Selberg (1940) who reviewed 104 metastasising carcinoids; this is that, though these growths should technically be classed as carcinomata of Broder's grade I, their rate of growth is so slow that excision, even if not absolutely complete, offers a very fair prognosis.

SUMMARY

A carcinoid of the ileocæcal junction, causing obstruction, was thought at operation to be a carcinoma, but the patient has done well after a partial colectomy.

The prognosis in such cases is fair, and radical excision of doubtful growths in this region may be justified.

I am grateful to Mr. David Levi, surgeon to Harefield Hospital, for allowing me to publish his case; Dr. L. G. Blair for the radiological investigations; Dr. D. M. Pryce for the pathological reports; and Mr. W. Pereira, A.I.M.L.T., for the photographs.

REFERENCES

Ariel, I. M. (1939) *Arch. Path.* **27**, 25.
Cooke, H. H. (1931) *Arch. Surg., Chicago*, **22**, 568.
Dangremond, G. (1942) *Amer. J. clin. Path.* **12**, 223.
Forbus, W. D. (1925) *Bull. Johns Hopk. Hosp.* **37**, 130.
Latimer, E. O. (1941) *Amer. J. Surg.* **54**, 424.
Lubarsch, T. (1888) *Virchows Arch.* **111**, 280.
Mallory, T. B. (1936) *New Engl. J. Surg.* **215**, 1176.
Oberndorfer, C. (1907) *Frankfurt. Z. Path.* **1**, 426.
Potter, E. B., Doctor, J. M. (1944) *Amer. J. Path.* **20**, 143.
Raiford, T. S. (1933) *Amer. J. Cancer*, **18**, 803.
Selberg, W. (1940) *Virchows Arch.* **306**, 467.
Wengen, H. C. á (1941) *Klin. Wschr.* **20**, 316.

MASSIVE TONSILLAR LYMPHATIC ADENITIS

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ADENITIS of the tonsillar lymphatic gland is usually due to an infection of the throat that is clinically evident, but from May to November, 1946, the outpatient department of this hospital saw a minor epidemic of massive adenitis of the tonsillar lymphatic glands with minimal or no sign of tonsillar infection. The children usually presented strikingly little constitutional disturbance. The outstanding feature was a "bull" neck suggesting diphtheria while the throat looked normal. The onset was usually abrupt. A typical case was as follows:

A child, aged 1 year, was perfectly well six days ago. Five days ago a flabby swelling appeared on the left side of the neck, and next day the lump hardened. The family doctor diagnosed mumps, but the swelling got larger so the mother brought the child to hospital.

On examination: temperature 98·6°F, pulse-rate 110, respiration-rate 30 per min. Bull neck on left side. Palpation showed that this swelling was due to enlargement of the left tonsillar gland. Parotid duct and glands normal. Tonsils normal. Fauces not injected. No other glands enlarged, and spleen impalpable. Teeth good.

Laboratory Investigation.—Tonsillar swabs: normal flora. Hb 70% (Haden). White-cell count 20,300 per c.mm. (neutrophils 42%, lymphocytes 54%, monocytes 3%, eosinophils 1%). Erythrocyte-sedimentation rate (E.S.R.) 20 mm. in 1 hour (micro method).

Progress.—Under kaolin poultices the gland gradually subsided. Convalescence was somewhat slow.

The main findings in 21 cases are shown in the accompanying table.

DISCUSSION

There was no unequal sex-incidence, and the ages varied from one to ten years. Of the 21 patients, 2 had injected fauces and 3 had enlarged tonsils. In 3 the glands suppurated. The white-cell count was not constant: in 9 cases it was within normal limits, whereas there was a leucocytosis in 11, of which 8 showed a true lymphocytosis. The E.S.R. was uniformly raised. Most of the patients were moderately or severely anæmic. There was no obvious relationship between the state of the throat and the enlarged gland or glands.

Case 14.

During this period the usual number of cases of tonsillar and cervical lymphadenopathy were seen in the outpatient department, in which bacteriology and clinical signs ran parallel—i.e., acutely inflamed throats from which a hæmolytic streptococcus or *Staph. aureus* was isolated.

In the differential diagnosis, diphtheria, tonsillitis, dental sepsis, &c., were dismissed by close examination of the throat and mouth and on the lack of constitutional upset; lymphatic leukæmia by the blood-count and the natural history of the disease.

Infectious mononucleosis and infectious lymphocytosis demanded closer consideration. The 4 cases in which the Paul-Bunnel was done gave uniformly negative results; in no case was the differential white-cell count compatible with the diagnosis of infectious mononucleosis; and symptoms suggesting mononucleosis were not elicited.

Infectious lymphocytosis cannot be so definitely ruled out. Meyer [1] states that in this disease the lymphatic glands are not greatly enlarged, and that a well-marked lymphocytosis is always present. An annotation in THE LANCET [2] emphasises the lymphocytosis, with peak counts rising to 58,000 per c.mm., in infectious lymphocytosis and notes the presence of a morbilliform rash in a proportion of those attacked. Steigman's cases are mentioned in which the cervical lymph-glands were notably enlarged. In the present series cases 2, 3, 6, 8, 9, 16, 20, and 21 showed a true lymphocytosis, ranging from 6100 to 15,200 per c.mm., which scarcely seems high enough to justify the diagnoses of infectious lymphocytosis. Further, none of the patients had a skin rash. However, it is possible that this epidemic is a variant of infectious lymphocytosis.

There appear to be two alternative explanations for the adenitis:

(1) A hitherto undescribed infection of the throat, possibly of virus origin, with minimal reaction in that area and a well-marked secondary adenitis.

(2) Bacterial infection which, by the time the patient is seen, has cleared from the throat and settled in the gland or glands.

If the disease is due to a bacterial infection, one would expect a greater constitutional reaction, a constant leucocytosis, and a reasonable proportion of the cases showing suppurative changes in the affected glands. This did not happen. Further, there is the family spread

1. Meyer, L. M. *Amer. J. clin. Path.* 1946, **16**, 244.
2. *Lancet*, 1946, ii, 949.

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ANALYSIS OF 21 CASES OF MASSIVE TONSILLAR LYMPHATIC ADENITIS

Case no. and sex	Age (yr.)	Duration	Cervical lymph-glands	Tonsils	Laboratory findings	Outcome	Remarks
1 M	1¾	Aug. 1–Sept. 24	Right and left much enlarged	Normal	1st swab: normal flora; 2nd swab: hæm. strep.; white cells 15,300 per c.mm. (P 55%, L 39%); Hb 68%; E.S.R. 18 mm. in 1 hr.	Resolution	With return of glands to normal the tonsils swelled. On Sept. 11, 1946, white cells 18,800 per c.mm. (P 62%, L 34%); Hb 84%
2 F	1¾	June 22–Sept. 2	Left much enlarged; right normal	Normal	Normal throat flora; white cells 20,300 per c.mm. (P 42%, L 54%); lymphocytes 10,960 per c.mm.; Hb 70%; E.S.R. 20 mm. in 1 hr.	Resolution	On Aug. 23, 1946, white cells 19,600 per c.mm. (P 63%, L 29%); Hb 70%
3 M	1	Aug. 12–21	Left large; right moderately enlarged	Fauces red	Normal throat flora; white cells 15,000 per c.mm. (P 48%, L 48%); lymphocytes 7200 per c.mm.; Hb 56%; E.S.R. 17 mm. in 1 hr.	Resolution	Sent to hospital as mumps; on Dec. 2, 1946, Hb 82%
4 M	2	Aug. 17–22	Right and left enlarged	Much hypertrophy	Normal throat flora; white cells 9000 per c.mm. (P 57%, L 31%); Hb 65%; E.S.R. 12 mm. in 1 hr.	Resolution	Cases 3, 4, and 5 are siblings
5 F	6	Aug. 26–Sept. 10	Right and left enlarged	Normal	Record lost	Resolution	..
6 F	4	Aug. 27–Sept. 17	Right and left enlarged	Moderate hypertrophy	Normal throat flora; white cells 20,000 per c.mm. (P 22%, L 76%); lymphocytes 15,200 per c.mm.; Hb 84%; E.S.R. 14 mm. in 1 hr.	Resolution	During course of illness developed feverish cold
7 F	1¾	Sept. 1–17	Right much enlarged; left normal	Normal	Normal throat flora; white cells 8000 per c.mm. (P 42%, L 52%); Hb 70%; E.S.R. 12 mm. in 1 hr.	Resolution	..
8 M	5	Aug. 30–Sept. 24	Left normal; right enlarged	Normal	Normal throat flora; white cells 19,000 per c.mm. (P 33%, L 58%); lymphocytes 11,000 per c.mm.; Hb 90%; E.S.R. 20 mm. in 1 hr.	Suppuration	Shift from lymphocytosis to polymorph leucocytosis as pus formed; *Staph. aureus* isolated from pus
9 M	1¾	Sept. 15–23	Left enlarged; right normal	Normal	Normal throat flora; white cells 12,500 per c.mm. (P 23%, L 72%); lymphocytes 9000 per c.mm.; Hb 76%; E.S.R. 18 mm. in 1 hr.	Resolution	Preceded by acute attack of tonsillitis
10 F	9	Sept. 5–Oct. 1	Right enlarged; left normal	Absent	Normal throat flora; white cells 10,000 per c.mm. (P 37%, L 55%); Hb 76%; E.S.R. 16 mm. in 1 hr.	Resolution	Tonsils and adenoids had been removed a year before onset
11 M	7	Nov. 14–23	Left enlarged; right normal	Normal	Normal throat flora; white cells 6600 per c.mm. (P 30%, L 64%); Hb 85%; E.S.R. 10 mm. in 1 hr.	Resolution	..
12 M	10	May 22–June 21	Right and left enlarged	Normal	Normal throat flora; white cells 10,300 per c.mm. (P 60%, L 32%); Hb 68%; E.S.R. 14 mm. in 1 hr.; Paul-Bunnel neg.	Resolution	..
13 M	5½	June 3–Sept. 4	Right and left enlarged	Injected	Normal throat flora; white cells 10,000 per c.mm. (P 60%, L 38%); Hb 89%; E.S.R. 16 mm. in 1 hr.	Resolution	Slow convalescence
14 M	8½	June 20–July 22	Left enlarged; right normal *	Normal	Normal throat flora; white cells 17,500 per c.mm. (P 66%, L 28%); Hb 74%; E.S.R. 22 mm. in 1 hr.; Paul-Bunnel neg.	Suppuration	Admitted to hospital; hæmolytic streptococci isolated from pus
15 F	2	June 28–July 7	Right enlarged; left normal	Normal	Normal throat flora; white cells 10,300 per c.mm. (P 70%, L 20%); Hb 68%; E.S.R. 17 mm. in 1 hr.	Resolution	..
16 F	4	July 12–22	Right slightly, left much, enlarged	Normal	Normal throat flora; white cells 12,800 per c.mm. (P 29%, L 63%); lymphocytes 8060 per c.mm.; Hb 80%; E.S.R. 16 mm. in 1 hr.	Resolution	..
17 F	1	July 15–19	Left enlarged; right normal	Normal	Normal throat flora; white cells 8000 per c.mm. (P 45%, L 43%); Hb 76%; E.S.R. 15 mm. in 1 hr.	Resolution	..
18 M	9	July 20–25	Left enlarged; right normal	Hypertrophied	Normal throat flora; white cells 11,000 per c.mm. (P 58%, L 34%); Hb 72%; E.S.R. 17 mm. in 1 hr.	Resolution	..
19 M	4	June 9–July 1	Right and left enlarged	Normal	Normal throat flora; white cells 22,100 per c.mm. (P 56%, L 33%); Hb 46%; E.S.R. 24 mm. in 1 hr.; Paul-Bunnel neg.	Suppuration	Hb rose steadily on iron: Aug. 5, 1946, 57%; Oct. 16, 70%; Jan. 7, 1947, 88%
20 F	1¾	July 1–5	Right much enlarged; left normal	Normal	Normal throat flora; white cells 17,500 per c.mm. (P 35%, L 61%); lymphocytes 10,600 per c.mm.; Hb 72%; E.S.R. 22 mm. in 1 hr.	Resolution	..
21 M	3½	June 23–July 9	Right enlarged; left normal	Normal	Normal throat flora; white cells 12,100 per c.mm. (P 43%, L 51%); lymphocytes 6100 per c.mm.; Hb 74%; E.S.R. 14 mm. in 1 hr.; Paul-Bunnel neg.	Resolution	..

All erythrocyte-sedimentation rates by the micro method. Hæmoglobin estimated colorimetrically by Haden's method.
P, polymorphs; L, lymphocytes. * See figure.

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in cases 3, 4, and 5 to consider, and the appearance of the condition in a child who had had the tonsils and adenoids removed (case 10). Such evidence as has been collected seems to point to a non-bacterial cause.

The series raises the question of assessing the healthiness of the throat in children. Here there was visible and palpable evidence of mischief which primarily must have developed in the pharynx, yet when the pharynx was examined both clinically and bacteriologically it was to all intents healthy.

SUMMARY

A series of 21 cases of massive tonsillar adenitis in children is described in which the throat appeared to be normal. There was no evidence of infectious mononucleosis, but 8 children had a true lymphocytosis, and it seems possible that the condition was a variant of infectious lymphocytosis.

We are indebted to Mr. R. A. Ramsay, F.R.C.S., for permission to use the material presented. All the cases were seen in his surgical outpatient department.

CLICKING PNEUMOTHORAX

RELATED TO WALKING

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PREVIOUSLY recorded cases of clicking pneumothorax [1] have all been on the left side, and in each case the click has been synchronous with the heart's action. In the present case the pneumothorax was on the right side, and the subjective sensation was related to putting the right foot to the ground.

An acetylene-welder, aged 24, was seen as an outpatient at the Birmingham General Hospital on July 16, 1947, complaining of a clicking sensation behind the sternum, "something rubbing around" in the right chest, shortness of breath on exertion, and cough.

Three weeks earlier, while on a holiday, he dived into cold water, and next day had a tight sensation, aggravated by deep inspiration, round the lower part of the right chest. The pain became less severe but had not cleared completely after three days. Four days later he began a ten-mile walk but after the first half-mile he was irritated by the fact that every time he put his right foot to the ground he heard a clicking in the centre of his chest. This was not audible to his companion. The clicking persisted up to the time he came to hospital; and he emphasised its occurrence on putting the right foot to the ground and only after walking some distance. He returned directly from his holiday to his moderately heavy work and was short of breath only on severe exertion. A slight cough had been present for several years and did not increase after this episode. He smoked and inhaled about twenty cigarettes a day, and his cough produced small amounts of black sputum.

Three years before he had had a similar pain but with no clicking and no shortness of breath. The pain had lasted only a few days.

His father had died of pulmonary tuberculosis twelve years earlier. The members of his family had had their chests radiographed annually for the next six years, but with negative results.

He was well nourished and sun-tanned, and had no respiratory distress. The apex-beat was in the normal position, and the trachea central. The right side of the chest moved less than the left, and vocal fremitus was diminished all over the right side. There was no alteration of percussion note, but breath sounds were absent over the whole of the right side and rather harsh and vesicular over the left. No click was audible to me. There were no abnormal physical signs in the other systems. Radiography of the chest showed complete collapse of all lobes of the right lung, without mediastinal displacement.

He was admitted to hospital, where the only two specimens of sputum which could be obtained were negative for tubercle bacilli. Erythrocyte-sedimentation rate was 1 mm. in the first hour (Westergren), and a blood-count was entirely normal. The Mantoux reaction was positive at 1 in 1000.

By Aug. 12 the right lung had completely re-expanded. There was a small calcified shadow at the right hilum, but no evidence of active disease. The patient was discharged home. He has been seen again since as an outpatient; he remains symptom-free and is in regular work.

It is difficult to understand how the action of walking could produce the clicking sensation of which this patient complained. Since the pneumothorax was total, Prof. A. P. Thomson's explanation of the clicking by separation of viscous surfaces is not applicable. I have discussed the case with Professor Thomson, and we cannot suggest any explanation. We are unaware of any similar case.

My thanks are due to Professor Thomson, and to Prof. A. V. Neale, of Bristol, lately physician to the Birmingham United Hospital, in whose absence I saw the patient as an outpatient and under whose care he was while in hospital, for permission to record the case.

1. Scadding, J. G., Wood, P. *Lancet*, 1939, ii, 1208. Thomson, A. P. *Ibid*, 1947, i, 639. "Medico." *Ibid*, p. 766. Dunner, L. *Ibid*, p. 848.

Preliminary Communication

NITROGEN-MUSTARD THERAPY COMBINED WITH SPLENECTOMY

THE value of the nitrogen mustards in the treatment of Hodgkin's disease not responding satisfactorily to X-ray therapy is now established, but the administration of these drugs is followed as a rule by undesired side effects, one of which is a leucopenia preventing the further use of the drugs in optimal doses. This happened in cases in which, before the start of nitrogen-mustard therapy, the white-cell count was low—e.g., 1300 per c.mm.—because earlier treatments by other means had caused a leucopenia while the gland masses as well as the fever remained uninfluenced. The different treatments applied to raise the white-cell count—transfusions, folic acid, pentose nucleotide, liver extract—did not have the desired effect.

This led me to suggest splenectomy as a means to raise the white-cell count so that nitrogen mustards could be used. In one case, 3 days after splenectomy a white-cell count of 14,000 per c.mm. was found, oscillating during the following weeks around 10,000 per c.mm. X-ray treatment was then tried again but did not affect the course of the disease or the white-cell count (now normal). With the patient in a rather poor condition treatment was started with nitrogen mustard 4 mg. daily for 4 days, later increased to 5 and 6 mg. daily. The usual nausea and vomiting followed the injections, but there was no significant drop in the white-cell count. The patient recovered rather quickly and during the 6 months since this treatment has been free from symptoms. There is no doubt that in this case administration of nitrogen mustard would not have been possible had not the white-cell count been restored by splenectomy.

In a second case a leucopenia of 800 white cells per c.mm. was corrected within 24 hours to 8400 per c.mm. In two other cases a combination of nitrogen-mustard therapy with splenectomy produced a similar and immediate beneficial response.

For the final assessment of the combined treatment with splenectomy and nitrogen mustards further observations are needed, but the impression arising from these first observations is that this method may allow the use of nitrogen mustards when extreme leucopenia would otherwise forbid it, and enable a more effective dose to be given.

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Rupture of Cervical Intervertebral Discs

AT a meeting of the neurological section on March 4, with Dr. C. C. WORSTER-DROUGHT in the chair, the discussion was opened by Dr. W. RUSSELL BRAIN. The clinical features, he explained, may be those of cervical-root irritation, or cervical-cord compression, or both. The pathological basis can be a simple osteo-arthritis of the cervical spine or a true disc lesion, and it is often a combination of the two; the protrusion may be purely cartilaginous or partly bony. It is probably wiser to think in terms of root and cord changes secondary to changes in the cervical joints as a whole, rather than the result of a single prolapse. The nerve-roots in this region are firmly anchored by the denticulate ligament, and their short transverse course makes them vulnerable to compression. The central fibres of the posterior common ligament are the weakest, so the protrusion can be central and directly backward, immediately in front of the cord, or lateral, at the free edge of the ligament, where it endangers the root and the anterolateral aspect of the cord. The vascular disturbances resulting from disc prolapse are extremely important at all stages. The earliest features are probably due to venous stasis, which, since the flow in the plexuses is upwards, can produce œdema of the segments immediately below the level at which direct compression is occurring. The lateral spinal arteries may be caught at the foramina, and it is possible for the vertebral vessels themselves to be compressed by osteophytes. Of 10 surgically verified cases, most were in people of middle age or over; only 2 had root symptoms alone, the majority suffering from cord compression. Trauma seemed significant in only 1 case, but 7 patients had well-marked osteo-arthritis of the cervical spine. There seems to be a range of cases from the mainly traumatic variety in younger patients, possibly associated with congenital deficiency of the annulus fibrosus and more likely to cause root symptoms, to the condition in older people where any protrusion is an incident in a general arthritis and may be largely osteophytic. Of Dr. Brain's 10 cases, in 5 the lesion was between the 5th and 6th vertebræ and in 2 between the 4th and 5th. There are four modes of onset: acute pain in the neck and one arm; insidious or remittent aching in the same areas; gradual development of root and cord compression; or, most uncommon, a quietly progressive cord lesion alone. The main symptom of root compression is shooting or burning pain, exacerbated by coughing and moving the neck, with periods of remission, and this may irradiate widely into the chest or scapular region. Any associated sensory loss is often slight and superficial, and, while diminution of tendon reflexes is common, actual wasting is unusual. Of the 8 cases with cord features, 4 had a Brown-Séquard syndrome and 4 showed evidence of bilateral compression, but in every case but one the disc protrusion was lateral—i.e., the syndrome may be bilateral and symmetrical from the outset with no clue to the side of the lesion. The pyramidal tracts are more vulnerable than the sensory fibres, in spite of the fact that it is the anterolateral tracts which are directly exposed to pressure. It is common to find associated wasting of the intrinsic muscles of the hand, the innervation of which is two or three segments lower than the level of the usual lesion, and this must be due to descending œdema—the 1st thoracic segment appears to be even more vulnerable than the intervening segments. The cerebrospinal fluid usually shows some abnormality, either in its protein content or in the Queckenstedt response. In diagnosis, it may be difficult to decide whether or not osteo-arthritis is accompanied by disc prolapse, and oblique radiography may help in demonstrating local osteophytes, but opaque myelography must be the last resort. Recovery with conservative methods—rest, traction, plaster fixation—is possible and perhaps usual. Operation is indicated only in those few cases exhibiting cord compression or unrelieved pain.

Mr. G. C. KNIGHT felt it was incorrect to regard cervical disc lesions as the commonest cause of brachial neuritis. The anatomical peculiarities of the nerve-roots mean that even a small protrusion will cause symptoms, but also that a single protrusion can compress only one root. Therefore involvement of two roots implies two separate lesions, and this is much more likely to be osteophytic in origin. The relation of central protrusions to the anterior spinal artery is important both in connexion with a causative injury and in surgical treatment; thrombosis produces an ascending effect on the cord, so that a sudden traumatic prolapse may be accompanied by phrenic palsy while the removal of a central lesion can leave permanent paraplegia. The acute prolapse of traumatic onset is possibly not so much a nuclear extrusion as a squeezing out of the whole disc, and the injury itself is often trivial. There may be an immediate quadriparesis with an initial sensory loss up to arm level, followed by an upward extension of the involved area due to secondary vascular changes; and this may be irreversible. In less serious cases, with sensory loss confined to the trunk, there may be rapid recovery of sensation but permanent spasticity and sphincter disturbance. In the more chronic monoradicular syndrome pain may be felt as far afield as the precordium and scapular regions, and the misdiagnosis of coronary disease has led to unnecessary invalidism. Pain is seldom felt to the full distal limit of the dermatome, and root localisation is best made on the associated paræsthesiæ, but reliable localising signs are often late. Quite early rigidity and tenderness of the neck are common; in particular, lateral flexion to the side of the lesion exacerbates the symptoms, though often only after a latent interval of half a minute or so. A feature of the chronic cord compressions is the typical variability of the clinical picture in the same patient with the passage of time, and a very chronic condition may be mistaken for dissimilar neurological disorders at different times, possibly because of changing vascular disturbances. The best treatment, in Mr. Knight's view, is a long waiting-list, for spontaneous improvement is common. Rest in a comfortable position is sufficient treatment for many cases. Manipulation of the cervical spine under anæsthesia has given successful results, though he himself regards it as dangerous. Operation is never indicated for the minor degrees of monoradicular irritation and should only be done for severe root compression when all conservative measures, including plaster fixation and skull traction, have failed. All cases of hemicord-compression call for intervention, but serious reflection is advisable before tackling central lesions involving the whole cord, for in these there is grave danger of injury to the cord, either directly or through its vessels. With a high lesion, which may already be accompanied by weakness of the diaphragm, it might well be best to leave things alone or merely to decompress. The surgical approach for monoradicular involvement was a hemilaminectomy, for cord compression a full laminectomy; in the latter a transdural approach to the prolapse had its advantages where extradural access was difficult and dangerous.

Dr. J. W. D. BULL, who discussed the radiological aspects of the condition, expressed considerable scepticism as to the frequency of gross disc prolapses and their ability to cause symptoms. If the protrusion is a nuclear one, it can hardly be larger than a red-currant. In his opinion, the clinical importance of the neurocentral joints between the sides of the vertebral bodies has been overlooked. The cervical nerve-roots below the second are the only ones with a synovial joint both in front (the neurocentral) and behind (the interpedicular); and it has been shown that arthritis and osteophytes arising from the former can not only compress and irritate the nerve-roots but can even compress the vertebral vessels in their canal. He has not found opaque myelography very helpful in demonstrating genuine disc prolapse, and he suggested that it is commoner to note a lessened rate of flow of the medium as it enters the cervical region than a really well-defined filling defect.

Several later speakers emphasised the adequacy of conservative treatment for cases of monoradicular involvement and the frequency of spontaneous recovery.

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Reviews of Books

Unipolar Lead Electrocardiography

EMANUEL GOLDBERGER, B.S., M.D., adjunct physician, Montefiore Hospital, New York. London: H. Kimpton. 1947. Pp. 182. 20*s*.

WITH bipolar limb and bipolar precordial leads an electrocardiogram records the difference in potential at the sites of the two electrodes, but not the actual potential at either. This is comparable, in Goldberger's opinion, to recording the difference between the systolic and diastolic pressures but not their individual levels. His criticism applies more to the original standard leads, where electrodes are paired on the limbs, than to the precordial electrode paired with one on a limb. In the latter the distortion caused by the distant or indifferent electrode is slight. For the unipolar limb and precordial leads it is claimed that they differentiate between position of the heart and ventricular hypertrophy as a cause of axis deviation. This is sometimes but not always possible, and as Dr. Goldberger's own illustrations show, none of the leads may reveal the hypertrophy which is believed to be present, or distinguish certainly between hypertrophy and position of the heart in the chest. Unipolar leads may be useful in differentiating pulmonary embolism from posterior cardiac infarction (though usually this is possible with bipolar leads either immediately or after a short time). With unipolar leads, bundle-branch block can be more accurately diagnosed, and small myocardial infarctions, and combined old and recent infarctions, recognised. However, there are probably few cases of acute infarction revealed by unipolar leads and not by the older methods. Thus while the unipolar leads occasionally give information which the bipolar ones do not, their superiority is not so great that they can be expected to supplant the older methods for a long time. For their interpretation it seems necessary to combine them with cardioscopy so that the position of electrodes in relation to the four chambers of the heart can be determined. Indeed radioscopy alone may still be the best way of assessing the position of the heart and the size of its various parts. Most cardiologists will find it impracticable to take all the 12 leads recommended by Goldberger as a routine—that is 3 standard and 9 unipolar leads—but they may compromise for the present by taking two unipolar precordial leads (V_2 and V_4) and the three standard leads. In a particular case the need for additional leads may be indicated by those already taken, or by the radioscopic and clinical findings.

Dr. Goldberger's monograph could be improved and polished, and some errors—for example where a legend does not agree with the text—eliminated. But cardiologists will be grateful for a book on this relatively new cardiographic method.

Year Book of Physical Anthropology, 1946

Editor: GABRIEL LASKER. New York: Viking Fund. 1947.

LIKE its predecessor, this is a series of reprints, with a report on the annual summer seminar of American physical anthropologists. The emphasis, in this volume, has shifted from palæoanthropology to growth, and the eight articles on human and animal growth are of immediate interest to pædiatricians. Harold Stuart reviews normal growth and development during adolescence, and, with Howard Meredith, discusses the use of body measurements in the school health programme. He recommends seven anthropometric measurements for routine school use in assessing the normality of growth and nutrition. The omission of sitting height and the bicondylar diameters seems surprising, however, and statistics based on percentiles are less precise than the usual standard deviation measure of scatter, and are no easier for a doctor of average intelligence to understand. A better way of reporting growth data is that adopted by the Fels Foundation Study of Antioch, also reported in the yearbook, by Sontag and Reynolds. Nancy Bayley contributes tables predicting adult stature from the age of 7 onwards, and Washburn reports the experiments showing that the normal pull of the facial muscles in animals is a factor in normal growth of the facial skeleton. He suggests that small asymmetries of some skull bones may be due to asymmetrical use of the facial muscles during the growing periods: so perhaps the nurse was right who used to warn us against pulling faces.

Seltzer writes on the relation of physique and physical fitness tests, demonstrating once more the sterility of the classical single-measurement anthropometric approach and the promise of the Sheldonian system; while Brew discusses the uses and abuses of classifications in anthropology.

There are four short review articles from Great Britain, but nothing from Scandinavia, Switzerland, Russia, or South America. We look forward next year to seeing translations from the really inaccessible foreign journals.

Diseases of the Joints and Rheumatism

KENNETH STONE, D.M., M.R.C.P., honorary physician, B.R.C.S. Clinic for Rheumatism, Peto Place. London: W. Heinemann. 1947. Pp. 362. 30*s*.

STUDENTS, and general practitioners too, have long needed a full account of rheumatism and other painful disorders of the locomotor system, and Dr. Stone has endeavoured to provide it. Beautifully produced and illustrated, his book covers the anatomy and physiology of joints, methods of examination, rest and movement, the pathology of arthritis, the various types of rheumatic and rheumatoid disease, and the effects of disease in individual joints—a separate chapter for each. The second half sets out his own view of the vagotonic origin of muscular rheumatism; and even those who reject this hypothesis may enjoy his account of the vegetative nervous system. But while his individual approach to the subject, and his theories of causation, help to make the book stimulating, they are scarcely suited to a textbook intended for students. Rheumatism is at best a bewildering subject, and theories of causation are numerous. We could wish that Dr. Stone had reserved for another work, addressed to post-graduates, his account of what he and others hope or suppose.

Practical Histology for Medical Students (4th ed. London: H. K. Lewis. 1947. Pp. 136. 12*s*. 6*d*.).—The new edition of Prof. D. T. Harris's well-tried book needs no introduction. It contains, as ever, the information the student needs in his histological work, and still carries the generous supply of blank pages—made of good paper, too—on which he can record his findings.

Medicine (5th ed. London: J. & A. Churchill. 1948. Pp. 831. 30*s*.).—Dr. G. E. Beaumont's textbook of medicine now has the portliness of middle age, and speaks of several new disorders and remedies, including fibrocystic disease of the pancreas, erythroblastosis, infective hepatitis, homologous serum jaundice, congenital agenesis of a lung, primary atypical pneumonia, carcinoma of the prostate treated by œstrogens, thiouracil treatment of thyrotoxicosis, scrub typhus, and aspirin and phenol poisoning. Fortunately a dozen or so new diseases are not likely to shorten the life of this hardy veteran; on the contrary.

Hormones and Vitamins (London: G. Newnes. 1947. Pp. 315. 21*s*.).—The aim of this "handbook for physicians and pharmacists" is to facilitate the dispensing of hormones and vitamins. It is quite a useful addition, particularly from the chemical, pharmacological, and pharmaceutical aspects, to the already vast library on this subject. On the clinical side Mr. G. A. Stephens does not always discriminate between what is proven and what is still hypothesis, but the clinician will find much useful information.

Die Skelettvarietäten des Fusses (Berne: Huber. 1947. Pp. 164).—Dr. Theo Marti gives a full and authoritative account of the numerous skeletal anomalies and accessory ossicles of the foot, including the variations in the sesamoids of the hallux and the different types of synostosis. Each variety is discussed in turn, the embryological, anatomical, and radiographic aspects are fully described, and on the clinical side emphasis is placed on differentiation from the results of injury in medicolegal work. The book will be useful to orthopædists and radiologists as a work of reference.

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THE LANCET
LONDON: SATURDAY, MARCH 13, 1948

Freedom and Responsibility

THE British have many faults; but they can fairly claim that a long political tradition enables them to reconcile most of their differences without dangerous strife. The old habit of finding a reasonable solution will, we hope, be displayed again in the present conflict over the National Health Service. There is no great difficulty in framing proposals which should be acceptable both to the Government and the profession, once they recognise the need to agree; and it is conceivable that when the British Medical Association's representatives meet next Wednesday they may already be asked to consider such proposals. If this stage has not been reached they will have before them the resolution by the council which we published last week, and they will note that this is couched in moderate terms. Since the result of the plebiscite was announced, the council, if it has not sought a settlement, has at least done nothing to make one less likely. May the representatives do likewise.

To achieve a settlement the Government have to remove the conviction of the majority of the profession that the scheme involves, and is indeed meant to facilitate, interference with professional freedom. The Minister of Health can properly be asked to display more sympathy with the doubts of the doctor who is asked to relinquish his private security without receiving what he regards as adequate public security against arbitrary alteration of his terms of service. We still believe, too, that the Government would be ill advised to insist on every practitioner taking part of his remuneration in a form which he may reject on grounds of principle. Actually, however, the threat to professional freedom lies less in any particular feature of Mr. BEVAN's proposals than in a more elusive bureaucratic infiltration of medical work. This is a risk inseparable from any form of organisation; but it is unfortunate that, in launching a service elaborately designed to give the doctor opportunities of counterbalancing the bureaucrat, the Minister has managed to create an impression that he is no longer interested in what our representatives have to say. He may excuse himself by pointing to the persistently negative attitude of the Negotiating Committee, and it is true that there is all the difference between discussion with people who are opposing your scheme and people who have joined you in trying to make it work; but the fact remains that the idea of medical participation in shaping and conducting the service has more and more receded into the background. Most notably, hardly anything is now said about the Central Health Services Council which was intended to be the very keystone of professional freedom under the Act. Until agreement is reached it may be impossible to establish this council and its standing committees; but we are disturbed to see so many lines of policy developing in its absence, and we trust the Minister will soon be in a position to demonstrate that, unlike the advisory council of 1921, it is to be made a reality. The machinery of consultation with experts at all levels is one of the most important features of the Act, and the one which, in medical eyes, gives the service its best hope of excellence. In fact, perhaps the most serious question now facing us is whether the National Health Service is or is not going to be conducted with the advice of the body meant by Parliament to voice the opinions of the profession and of other interested parties. Prompt establishment of the council might be the means best calculated to remove the fear that the service is to be run on bureaucratic lines; and a correspondent this week suggests that the council might even prove helpful in considering some of the issues now in dispute.

The widespread (but mistaken) belief that the whole scheme for a National Health Service is again in the melting-pot has led many people to think about the benefits of postponing all or part of it until a fresh start can be made with more nurses and doctors, with reconstructed hospitals, and with plenty of health centres. They are right, of course, in fearing that removal of the money barrier between doctor and patient will increase the strain on all medical workers, and may create grave difficulties and even confusion for several years to come. On the other hand, abolition of the fee-for-service system will also give the doctor a better chance to direct his efforts effectively towards cases of real need; and the fact that resources are limited is always a strong argument for planning their economical use. With an enormous problem of this kind there would certainly have been advantages in a solution by stages, but there are also certain advantages in a bold attempt at speed. In any case, discussion of the policy of gradualness became academic as soon as Parliament decided, despite (or because of) the difficulties caused by war, that from the earliest possible date no citizen should be without the basic necessities, including medical care. Since the time when that decision was taken under the Coalition Government the material situation has deteriorated, and with virtual cessation of expenditure on hospitals and health centres we have lost much of the feeling that medicine is being offered opportunities of progress of a new and inspiring kind. But when resources contract there is all the more need for brains and determination in the use of what is left. If much of the gilt has disappeared from the National Health Service gingerbread, all the more depends on the quality of the ginger; and the ginger must be supplied chiefly from the medical cupboard.

With the deplorable precedent of 1911 in his mind, the Minister has sometimes allowed himself to be distracted from the task of bringing the ordinary doctor into the service in a spirit of hope and endeavour. His opponents, for their part, have certainly not helped him to do so. Yet if there is to be a service at all—as there must be—the public will be wronged if that service falls short of what is possible in the circumstances. Whether it is good, mediocre, or bad rests in the last resort on the medical profession more than on anyone else. But doctors will not begin to make any real effort until they have reason to feel that in the new régime they will retain their freedom and responsibility to serve, to criticise, and to influence.

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The Lymphocyte

THE life-history and functions of the lymphocyte have been argued and disagreed about for many years, and the authors of standard textbooks can be forgiven if they say little about them. Twelve years ago RICH [1] said that "the complete ignorance of the function of this cell is one of the most humiliating and disgraceful gaps in all medical knowledge," and he pointed out that if all the lymphoid tissue were gathered together it would make one of the most imposing organs of the body. Research-workers have not been idle during these years, and the series of papers given before the New York Academy of Sciences in September, 1946, recorded definite progress.

It has often been shown that large numbers of lymphocytes are formed in the lymph-nodes and pass in the efferent lymph to the blood-stream. DRINKER and YOFFEY [2] calculated that the blood lymphocytes in the dog were replaced twice a day; SANDERS et al.[3] gave a figure of five times a day for cats. Disagreement has arisen over the fate of these lymphocytes. One school, associated with MAXIMOW, thought that the lymphocytes were transformed into other blood-cells—that the lymphocyte could act as a parent cell for all other types, including erythroblasts. This has always been a histologists' theory and has found little support from physicians and clinical pathologists. YOFFEY has contended that the excess lymphocytes are transformed into erythrocytes, but this explanation also has not been accepted. An explanation for which there is more support is that of BUNTING and HUSTON,[4] who noted the large numbers of lymphocytes collected in the intestinal mucosa, and suggested that many lymphocytes left the circulation by way of the gastro-intestinal tract. SJOEVALL [5] thought that lymphocytes passed out of the capillaries into the tissue spaces and then returned to the lymphoid tissue via the peripheral lymphatics; but it is difficult to account for all the lymphocytes in this way, since the number of lymphocytes in the lymph entering a gland is only a tenth of those in the lymph leaving the gland. HEIBERG's [6] theory was that lymphocytes returned to the lymphatic tissue in the afferent blood capillaries and were eventually destroyed in the so-called germinal centres, which he regarded as collections of macrophages engaged in phagocyting the remains of fragmented lymphocytes. EHRICH,[7] reviewing all these theories, favours HEIBERG's explanation. He points out that the germinal centres of lymphoid tissue—the nodes with pale-staining central cells—contain large numbers of macrophages filled with fragments of dead lymphocytes. A single germinal centre may contain several hundred macrophages; and, since each macrophage contains fragments from perhaps 20 lymphocytes, the number of disintegrating lymphocytes in a single centre must be several thousand. Since the number of such nodes throughout the body is very large, it is clear that a large proportion of the lymphocytes lost from the blood (estimated by KINDRED [8] in the rat to be over 1,000,000 per hour per 100 g. of body-weight) can be accounted for; the remainder are lost through the gastro-intestinal tract. The germinal centres, as their name implies, were originally described by FLEMMING as areas of lymphocyte formation. EHRICH does not deny this function of FLEMMING's nodes; they are, he says, both the birthplace and the graveyard of the lymphocytes.

NOW WHITE and DOUGHERTY [9] have produced evidence that, in animals at least, this process of disintegration of lymphocytes is controlled by the adrenal cortex and the pituitary adrenotrophin. In mice daily injections of adrenotrophic hormone reduce the lymphoid tissue, and adrenalectomy is followed by lymphoid hyperplasia. The cortical steroids responsible are those with an oxygen atom in the 11 position—i.e., corticosterone, but not desoxycorticosterone. Histological studies [10] have shown that six hours after the injection the germinal centres become œdematous and filled with degenerating lymphocytes and nuclear debris. Within nine hours mitotic figures appear, but the lymphoid centres remain smaller than before. The lymphocytes undergo various alterations, from budding or shedding of the cytoplasm to complete disintegration—processes comprised in the term "dissolution." This dissolution suggested that the lymphocytes were releasing some substance into the blood-stream. MCMASTER and HUDACK,[11] had previously shown that antibody might be formed in lymphoid tissue, and antibodies are known to be connected with the γ-globulin of serum. The changes in serum-proteins after injection of the hormone were therefore studied, and it was found that there was a significant rise in the β- and γ-globulin fractions. Extracts of lymphocytes studied electrophoretically have shown that γ-globulin is a normal constituent of these cells, besides other proteins. Since γ-globulins can be "labelled" with recognisable antibodies, rabbits were immunised to sheeps' red cells and were kept until all antibody had disappeared from their blood. An injection of pituitary adrenotrophin or of adrenal cortical steroids then released antibody into the blood. This release was accompanied by maximal lymphopenia and maximal dissolution of lymphocytes in the lymph-nodes. A small dose of X rays (10r) produced a lymphopenia and an increase of γ-globulin in the serum in normal mice but not in adrenalectomised mice. On the other hand, a dose of 200r produced these effects both in normal and in adrenalectomised mice because it destroyed the lymphocytes. These observations confirm the opinion of WHITE and DOUGHERTY that the dissolution of lymphocytes is normally controlled by the suprarenal glands.

Thus lymphocytes are closely connected with protein metabolism. They form an extrahepatic source of protein, especially of γ-globulin, and perhaps of the extrahepatic nitrogen found in the urine in conditions of stress, such as CUTHBERTSON [12] found in patients with extensive burns. The fact that they contain antibodies that can be released by appropriate

1. Rich, A. R. *Arch. Path.* 1936, **22**, 228.
2. Drinker, C. K., Yoffey, J. M. Lymphatics, Lymph, and Lymphoid Tissue. Harvard, 1941.
3. Sanders, A. G., Florey, H. W., Barnes, J. M. *Brit. J. exp. Path.* 1940, **21**, 254.
4. Bunting, C. H., Huston, J. *J. exp. Med.* 1921, **33**, 593.
5. Sjoevall, H. 1936, cited by Ehrich.[7]
6. Heiberg, K. A. *Virchows Arch.* 1922, **240**, 301.
7. Ehrich, W. E. *Ann. N.Y. Acad. Sci.* 1946, **46**, 823.
8. Kindred, J. E. *Amer. J. Anat.* 1942, **71**, 207.
9. White, A., Dougherty, T. F. *Ann. N.Y. Acad. Sci.* 1946, **46**, 859.
10. Dougherty, T. F., White, A. *Amer. J. Anat.* 1945, **77**, 81.
11. McMaster, P. D., Hudack, S. S. *J. exp. Med.* 1935, **61**, 783.
12. Cuthbertson, D. P. *Lancet*, 1942, **i**, 433.

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stimuli is of great importance, and EHRICH and HARRIS [13] have shown that this ability to produce antibody γ-globulin is not temporary but is passed on to cells of subsequent generations; tumours developing from transplants of antibody-containing malignant lymphocytes contained as much immune globulin as the original tissue.

These experiments present a coherent picture of the life-cycle and function of lymphocytes. They are born in the germinal centres by mitosis from other, perhaps more primitive, lymphocytes. They pass out in the efferent lymph and so reach the blood-stream. There they circulate and mature, increasing all the while the protein content—including γ-globulin—of their cytoplasm. In due course they return, by afferent lymph channels or more often by the blood-stream, to the lymphoid tissue. There they may shed their cytoplasm and perhaps pass on again to regenerate more cytoplasm, or they may die, their protein being released into the blood and their nuclear fragments being phagocyted by the macrophages. Anything that stimulates the pituitary-adrenal apparatus stimulates dissolution of the lymphocytes and release of protein. In an immunised subject immune globulin is released, and the wide distribution of lymphoid tissue ensures simultaneous release all over the body.

This conception has an attractive tidiness, but the discussion at New York showed that some workers find it difficult to accept. One of the major difficulties is to explain the fact that blocking of the reticulo-endothelial cells inhibits the formation of antibodies. To meet this, EHRICH postulates a "digestion" of the antibodies by the macrophages, but this is not very convincing. Nevertheless we now have a much clearer idea of the lymphocyte and should no longer regard it as the potential mother-of-all-cells. As EHRICH says, we have no need to assume that the lymphocyte is merely an undifferentiated hæmocytoblast, when all the evidence points to its independent life-cycle and special function.

Granuloma Venereum

GRANULOMA venereum (or, as the Americans prefer to call it, granuloma inguinale) is rarely seen in this country, and then only in seaport towns as an accidental invader. It is a chronic inflammation involving the upper layers of the corium, and appears in its earliest form as soft red nodules in the skin of the genitalia or inguinal region. The nodules break down and develop into areas of exuberant velvety granulation tissue, spreading by local tissue extension and by auto-inoculation. The lesions are serpiginous in outline, and spread slowly but widely in the course of weeks or months. The granulating areas are at first clean and exude serum which may be bloodstained. In time secondary infection occurs, the granulation tissue changes from red to dirty grey, and the discharge becomes purulent and foul-smelling. There is widespread ulceration and necrosis of soft tissues, with extension to mucous membranes, the formation of fistulæ, and ultimate healing with atrophic scar tissue. The causative organisms are believed to be the characteristic intracellular bodies, found in tissue scrapings or on biopsy, which were described by DONOVAN in 1905 and so are called "Donovan bodies." This organism has been cultivated in the yolk sac of the chick embryo, and manifestations of the disease have been produced in human volunteers by auto-inoculation, by tissue transfer from infected patients, and recently [1] by inoculating a negro volunteer with material from a successful yolk-sac culture.

In the countries where this disease is prevalent, which include the southern States of the U.S.A. and Dutch New Guinea, it is a serious and perhaps a growing problem. It is much more prevalent among negroes than among whites and in males than in females. GREENBLATT [2] describes it as a terrible affliction which slowly and inexorably ravages its victim. He says it is a neglected disease, poorly understood and badly handled, and that few hospitals and few physicians have been willing to treat it, because of its chronicity and the objectionable foul-smelling lesions. It is bred by poverty and neglect, but the method of its transmission is by no means established. Most regard it as a venereal disease, an opinion which, according to CLARKE,[3] is based on three observations: (1) the disease occurs in those who are sexually promiscuous; (2) the lesions are usually on the genitalia or near by; and (3) it often accompanies diseases known to be venereal. Those who doubt its venereal origin point to the fact that conjugal infection is uncommon, and that there are recorded instances of sexual partners who have been exposed repeatedly to the infection but have remained free. If, therefore, the disease is communicable sexually its infectivity must be low. There is uncertainty, too, about the length of the incubation period, which is certainly variable. Ordinarily it is supposed to be about three weeks, but the observed limits extend from a few days to four months.

In the past treatment has been thoroughly unsatisfactory. The only remedies which have established some reputation are the antimonial drugs, including tartar emetic and stibophen. Even so results have varied, and efficacy has decreased in direct proportion to the duration and chronicity of infection. Lately GREENBLATT and colleagues [1 4] have shown that streptomycin is effective and far superior to the antimonials in the treatment of this disease. Of 91 patients observed for periods ranging from a few weeks to over a year after treatment, 32 received 2 g. of streptomycin a day, or less, for an average of twenty days; in this group there were 8 recurrences, and 7 of these were treated again with successful results in 5. The course of treatment which ultimately proved satisfactory was 4 g. of streptomycin daily for five days, divided into four-hourly doses given intramuscularly. After this treatment Donovan bodies rapidly disintegrated and disappeared from the lesions, and healing followed in one to three weeks. Among the 58 patients who received this larger dosage there was only 1 recurrence, and this healed with more treatment. In 1 case healing followed the administration of streptomycin by vaginal suppository. Toxic effects were few and slight. They included

13. Ehrich, W. E., Harris, T. N. *Science*, 1945, **101**, 28.

1. Greenblatt, R. B., Dienst, R. B., Kupperman, H. S., Reinstein, C. R. *J. ven. Dis. Inform.* 1947, **28**, 183.
2. Greenblatt, R. B. *Ibid*, p. 181.
3. Clarke, C. W. *Ibid*, p. 189.
4. Kupperman, H. S., Greenblatt, R. B., Dienst, R. B. *J. Amer. med. Ass.* 1948, **136**, 84.

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pruritus in a few cases and an urticarial eruption in 1 case. Involvement of the eighth nerve was not observed. If this initial promise is fulfilled a major public-health problem may be solved in the countries concerned, and we may hail another victory for the new antibiotics.

Annotations

BEDS FOR THE TUBERCULOUS

WHEN beds are scarce tuberculosis presents a double problem. Should the late and hopeless case be kept in the sanatorium, while new cases, awaiting admission, lose ground and perhaps pass from the easily curable to the chronic phase of the disease? Or should the late cases be sent home, possibly to infect others, while the early cases are admitted for the treatment which may save them from a life of invalidism? Dr. Frederick Heaf recently offered his solution of this problem in his presidential address [1] to the Tuberculosis Association.

At present, he says, nearly 8000 people are awaiting their turn to enter a sanatorium; but of the 32,800 beds approved for the treatment of tuberculosis, 4200 are closed owing to lack of nursing and domestic staff. Even the working beds, in his opinion, are not used economically. Surgery is often tried on cases known to be bad risks, and superintendents cling to chronic cases, hoping for a miracle—though they have only to picture the large necrotic masses in the lungs, seen as X-ray shadows, to give a true prognosis. He therefore proposes that cases needing thoracic surgery should be concentrated in regional centres, and that surgery should not be undertaken in the smaller sanatoria. Institutions with fully developed surgical units should as far as possible be cleared of chronic cases. The latter are of three kinds—the advanced bedridden case, the case needing either limited nursing care or convalescence, and the ambulant case which must be segregated. He has no hesitation in suggesting that the bedridden case should be sent home. The risk of infection, he believes, can be controlled to a few feet around the bed, and such patients are less dangerous to others than the ambulant positive case. Nevertheless, as he points out, slum conditions may be dreadful, and children—to protect them from danger—may have to be sent away if the sick person comes home. Conscious, no doubt, of the objections, he proposes that these children from poor homes should attend residential open-air schools, and be boarded-out in the holidays. Meanwhile the household domestic difficulties could be relieved by a team of orderlies organised by the local authority. In some cases the provision of an open-air shelter in the back yard may make it possible for a patient to be received at home who would otherwise have to stay in a sanatorium bed.

The patient convalescent after an operation might, Dr. Heaf thinks, be taken into a small home in the country, of the type seen in Scandinavia and Holland. Such homes need only 10–15 nurses for every 100 beds; and they could also house patients for whom protracted sanatorium treatment could have no effect in prolonging life. Some of the smaller existing sanatoria, instead of attempting to undertake thoracic surgery, and duplicating expensive equipment, should be developed on these lines. For the ambulant case needing segregation he recommends that small units of 50–100 beds should be set up in towns, or on the outskirts of towns, where a sheltered workshop would offer some remunerative work. A visiting doctor would look after the residents' health. Since the patients themselves would be able to help in the work of the home, the only staff needed would be a matron and 6–8 nurses or nursing orderlies for every 100 patients. Also hostels might be established in connexion with Remploy factories, having a resident warden who would be a nurse, assisted by a housekeeper and domestic staff.

These suggestions all deserve study. It is easy to criticise their drawbacks on the grounds that they do not accord first place to the happiness of patients and their families; but Dr. Heaf does not claim that they are more than a makeshift to meet what Dr. Toussaint in his letter on p. 422 rightly calls an appalling situation.

1. *Tubercle*, 1948, **29**, 2.

A NEW SOURCE OF STREPTOMYCIN

IN the early days of penicillin therapy, when the drug was very scarce, useful quantities were recovered from the urine of patients under treatment [1] and the same has been done more recently in Germany for the same reason. The procedure was soon given up here as not worth while when supplies improved, for the urinary excretion of penicillin is highly variable and the drug itself unstable. Rather more than a year ago the suggestion was made in these columns [2] that streptomycin should similarly be recovered from the urine, because it seemed likely to be as scarce as penicillin was five years before and because a higher proportion is excreted unchanged. Much streptomycin has flowed down the sewers since then, but in this issue Mr. Miller and Mr. Rowley, PH.D., of St. Mary's Hospital, show clearly that recovery from the urine is both a feasible and a commendable proposition. About half of the streptomycin administered therapeutically is excreted in the urine, and Miller and Rowley found that 50–60% of this amount can be recovered in a form having not less than four-fifths of the original potency. The over-all recovery, therefore, is of the order of 25–30% of the dosage given. The streptomycin recovered in this way has been tested for histamine-like substances, toxicity, and the presence of pyrogens, and in each case the result has satisfied the requirements of the American Food and Drug Administration, which have been adopted as the standards of purity in this country. This means that for every 100 patients receiving streptomycin therapy for tuberculosis, in the customary dose of 2 g. daily, about 50–60 g. of the drug could be recovered for readministration every day, if all the urine (about 150 litres per day) was collected for this purpose. The experience with penicillin suggests that, far from being of inferior quality, the streptomycin obtained in this way will be particularly free from harmful impurities.

LIAISON WITH THE COLONIES

To improve the two-way flow of information between Britain and some of the Colonies, a panel of eighteen specialists are each to pay two visits to East or West Africa at intervals of three years. As announced in our news columns, this scheme is being subsidised for six years by the Nuffield Foundation, and, though the visits are to be informal, the plan is supported by the Colonial Office. The hope is that if it proves a success it will eventually be taken over and extended by the Government.

The disinclination of graduates in the United Kingdom to serve in the Colonies has long dismayed those who wish to see a first-class Colonial Medical Service. On another page a peripatetic correspondent partly explains this reluctance by the severance of professional ties which seems to be inevitable if a doctor remains out of this country for even a year or two. This correspondent evidently shares Sir Wilson Jameson's view [3] that the young man should be enabled to serve overseas for a

1. Abraham, E. P., Chain, E., Fletcher, C. M., Gardner, A. D., Heatley, N. G., Jennings, M. A., Florey, H. W. *Lancet*, 1941, ii, 177.
2. Leading article, *Ibid*, 1946, ii, 758.
3. See *Lancet*, 1945, ii, 569.

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limited period; plainly, if this could be arranged in the National Health Service without damage to the doctor's subsequent career at home, recruits would become more plentiful. One way in which this object might be achieved is by each of the medical schools "adopting" a specified Colonial area; this area would then become simply an extension of the region for which the university is now responsible, and from time to time it would be visited by the dean and consultants from the parent hospital in much the same way that a few consultants are now to tour parts of Africa. While offering the young man wide clinical experience without impairment of his subsequent chances, the arrangement would provide for the Colonial Service the doctors that it sorely needs. The present initiative by the Nuffield trustees may pave the way to great developments.

B.C.G. TECHNIQUE

THE pros and cons of B.C.G. vaccination in the control of tuberculosis have been argued with almost religious fervour. But neither its advocates nor its critics seem to have paid sufficient attention to the preparation of the vaccine and the assay of its antigenic potency. We have learnt by the hard way how essential an effective antigen is in immunisation against diphtheria and typhoid fever and we are now beginning to realise its importance in attempting to protect children against whooping-cough. The Calmette vaccine differs from these other antigens in that it is a living culture, so that in its preparation and assay great care must be taken to see that it is safe as well as effective. With the renewed interest in B.C.G. vaccination in this country, it was desirable to have the views of an expert on these aspects of the subject, and the Royal Society of Medicine opportunely invited Prof. K. A. Jensen, of Copenhagen, who has worked for 20 years with the Calmette vaccine in the laboratory and in the field, to the pathology section's discussion which is summarised on page 419. Early strains of B.C.G. were liable to cause intractable skin ulcers at the site of injection, and children still occasionally develop local abscesses or adenitis because in them it is difficult to ensure a true intracutaneous injection. On the whole, however, Professor Jensen says there should now be no risk or discomfort to the patient provided both preparation and inoculation are done correctly and carefully. Dr. A. Q. Wells's contribution to the discussion drew attention to the claims of the vole-bacillus vaccine to be considered in any scheme for large-scale immunisation. Here again there is the same need for care in the details of preparation and in the technique of inoculation. Wells's own preference is for the multiple-puncture technique, which, however, is not suitable for young children.

The usefulness of B.C.G. may also, it seems, extend to diagnosis. Last autumn Dr. H. J. Ustvedt, the president, told the Norwegian Medical Society how he and his assistant, Dr. A. Aanonsen, have employed a test with this vaccine as a substitute for the Pirquet and Mantoux tests in some 400 patients at the Ullevaal Hospital. Through a drop of B.C.G. (20 mg. per ml.) applied to the skin, two small punctures are made with gramophone needles on a holder. One of three reactions may follow. Occasionally the reaction is non-specific; this type appears after an interval of only one day, disappearing usually on the 2nd or 3rd day and always before the 6th. The second type—the "positive early reaction"—begins on the 2nd or 3rd day, reaching its maximum on the 6th or 7th; when severe, it gives rise to insignificant central necrosis and ulceration, healing in 5–6 weeks with a small pigmented scar. This reaction is interpreted as a sign of active tuberculous infection. When it does not take place, the third type—the "late reaction"—may be observed on the 10th to the 14th day. The second type deserves special notice because, in the opinion of Ustvedt and Aanonsen, it provides a more sensitive and specific index than the Mantoux test with 1 mg. of tuberculin.

ADVERTISING

THE Government is faced with a nice problem in organising the new State industries. Are they to be run in a spirit of sound commercialism or as social services? Take, for instance, the railways. No-one moving around the country can fail to observe how many railway hoardings and carriages are plastered with advertisements of dubious proprietary medicines. If the Railway Board are to be guided solely by the profit motive, then perhaps they are right to go on taking these advertisements; if, on the other hand, their job is also to protect the public from exploitation this source of revenue is disreputable. Most of the remedies are no doubt harmless enough; and even if some of them purge the pocket no less thoroughly than the bowel the purchaser cannot reasonably complain of trickery. Other announcements, by the more imaginative manufacturers, are less restrained.

During the committee stage of the National Health Service Bill the Minister of Health remarked:

> "It is not sufficient to say that credulous people ought to pay the price of their credulity. The fact is that many of these noxious nostrums are advertised so agreeably and so seductively that even hard-headed people are taken in by them . . . in my opinion, the time has arrived and, indeed, is long past, when the public of this country should be entitled to be protected against the ramp that is at present going on. . . ."

Ahead of the law, most British newspapers have a self-imposed censorship on their pharmaceutical advertisements. The railways are—or have hitherto been—less inhibited. As a State concern will they now develop the same social conscience as newspapers? Plainly, isolated action in this field by the Government would be difficult; it might be seen as a manifestation of arbitrary authoritarianism or even as reflecting the Government's vested interest in medical practice. The solution seems to be for Mr. Bevan to place another Bill before Parliament to clean up all forms of patent-medicine advertising.

TUBERCULOSIS IN GERMANY

AT the invitation of the Foreign Office two members of the Medical Research Council's staff last autumn visited the British Zone of Germany to review the notifications of tuberculosis. Viewed in the light of persistent accounts of tuberculosis as a growing menace in Germany, their report[1] is sensational. In 1946 the death-rate from all forms of tuberculosis in the British Zone amounted to 70 per 100,000 population, compared with 55 per 100,000 in England and Wales and 79 in Scotland. Locally, the highest figure was reported from Hamburg, where the rate, 85, may be compared with that of 132 for Glasgow in the same year. The surveyors are satisfied that the war-time rise in mortality from pulmonary tuberculosis has been checked, except perhaps in Schleswig-Holstein; but they believe that deaths from non-pulmonary forms are still increasing in certain areas. Further evidence that tuberculosis does not figure more largely among health problems in the Zone than in Great Britain is provided by the proportionate tuberculosis mortality: for example, in 1946 the figure for Schleswig-Holstein was 4·5%, compared with 6·2% for Scotland; while for Hamburg it was 5·7%, compared with 9·7% for Glasgow (1945).

As regards morbidity, the reviewers hold that notifications, as now received, are no guide to current trends in pulmonary tuberculosis; the startling increase is largely

1. Tuberculosis in the British Zone of Germany, with a Section on Berlin: Report of an Inquiry made in September–October, 1947, by M. Daniels, M.D., and P. D'Arcy Hart, M.D., F.R.C.P. H.M. Stationery Office. 1948. 6d.

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a paper increase. They are satisfied, too, that there has been no considerable increase in new cases of the more serious forms of pulmonary tuberculosis since the war ended, though there has probably been some real increase recently in the incidence of non-pulmonary disease—owing, it is suggested, to inefficient pasteurisation of the milk-supply. Furthermore the mass-radiography figures for Hamburg show no evidence of a high latent prevalence of tuberculosis; "these figures are not notably higher than results in London." The check in the war-time rise is ascribed to the generous institutional provision (the ratio of beds to annual deaths is 2·2 in the Zone compared with 1·3 in England and Wales), to the supplementary ration scheme for tuberculous families, and possibly to ending of the deterioration in living conditions. The position in Berlin, where the war-time rise in mortality was much greater than in the British Zone, is less satisfactory; but even here mortality from pulmonary tuberculosis appears to be declining while that from non-pulmonary tuberculosis is stationary.

The authors specify their proposals for more accurate recording of new cases and of deaths. "German officials," they add, "have repeatedly during the past year issued to Allied journalists and other visitors misleading and sometimes even false information regarding the tuberculosis situation in Germany." "Sweeping conclusions," they say, "have been drawn from erroneous data."

STATISTICS WITHOUT TEARS

"IF it hits you between the eyes, laddie, it's significant; if it doesn't, it isn't" was the advice given by a senior colleague to one of our peripatetic correspondents.[1] All who have struggled to master the elements of statistics would wish that this were so. Unfortunately, what appears to be obvious may not be true, and conversely the truth is seldom immediately obvious. Collection of data, arrangement of experimental comparisons, and assessment of the reasonableness of ensuing deductions all lie in the province of the medical statistician, and his special methods have been increasingly applied in social medicine and in therapeutic trials. Unfortunately, as Sir Max Page [2] lately pointed out, "in its rapid development modern surgery has been over-dependent on judgments tinctured by the emotional reactions common to mankind, and it has largely failed to utilise statistical research"—a comment applying with equal force to many other branches of clinical practice.

When so many are refurbishing their medical skills, a new edition of Prof. A. Bradford Hill's short book [3] is welcome, for it explains in logical rather than purely mathematical terms the ideas and methods used in statistical elucidation of the biological verities. An expanded chapter on actuarial life tables, for example, describes the use of the method of finding the "expectation of life" now standard in the assessment of results in the treatment of cancer.[4] A defect of earlier editions has been remedied by including an exposition of the "normal" frequency distribution and its place in tests of significance and the measurement of variability. The several forms of average now so much used in medical writing are described in full, and the discussion of the χ^2 test, of such value in clinical work where attributes can be recognised but not measured, has been extended. In the study of inter-group differences in social and occupational medicine, the technique of standardisation of rates is fundamental, and Professor Bradford Hill has brought this section up to date by referring at some length to such recent innovations as the comparative mortality index and the mortality ratio. The chief merit of his book lies, however, in the critical application of common sense to the numerical bases of expressed opinion. If they are to avoid the more serious blunders in logical inference from numerical results, all who would commit themselves to paper would do well to meditate on the chapter on Common Fallacies and Difficulties.

Demanding little beyond a clear head and some memory of simple arithmetic, this introduction to the use of statistical methods in medicine will remain the staff and comfort of all who strive after the Truth, and also of those who would be satisfied temporarily with the Diploma in Public Health.

1. *Lancet*, Feb. 21, p. 300.
2. *Proc. R. Soc. Med.* 1948, **41**, 113.
3. Principles of Medical Statistics. 4th ed. London: The Lancet Ltd. 1948. Pp. 252. 10*s.* 6*d.*
4. *Proc. R. Soc. Med.* 1948, **41**, 119.

RELATIONS IN THE FACTORY

"The firms with batteries of personnel record cards are not always the most efficient from the human relations point of view. The good firms all insist that personnel management rests primarily on personal contact."

IN a new broadsheet,[1] P.E.P. consider the studies already made—mostly in America—of human relations in industry, and discuss lines for their further investigation. In a tentative way they note the factors which usually go with good industrial output; and it is not perhaps news that workers in factories respond more energetically when they are treated as sensible people rather than as witless hirelings. However transparently true this may be to all who stand outside industry, it still seems to have escaped some firms, who—if they have advanced a little on the methods of personnel management ascribed to Scrooge—are still some way from the benevolence of Cheeryble Bros.

It seems that good working conditions alone will not make for good fellowship. Sometimes conditions above the average go with bad relations; sometimes relations and output are good in factories with poor conditions and amenities. Output and labour turnover offer a rough measure of relations; and sometimes where the first is poor and the second rapid, the mere initiation of a study by an expert team restores the confidence of workers and management alike, and stops the rot. The broadsheet, which contains a great deal of peptonised information, emphasises the importance of rate-setting with the approval of workers, and of systems of joint consultation, which allow the management to keep in direct touch with the workers, and the workers to offer ideas and suggestions, as well as grievances, directly to the management. A reason for poor work which neither party can control is lack of raw materials: and it is noteworthy that morale suffers less when the conveyor belts are kept going—even if this means the later addition of parts which should have been added on the assembly line—than when they are brought to a standstill until all the materials are to hand. "Nothing is more destructive of morale and high working capacity than to be kept in a factory shop doing nothing without knowing the reason," P.E.P. comment. Perhaps the chief sting is in the tail.

TREATMENT ABROAD

THREE months ago [2] the Treasury announced the formation of a committee of consultants to consider the relative urgency of claims to the limited amount of foreign money available to patients wishing to go abroad for treatment. For the remuneration of members of this committee a fee of four guineas was normally payable by the applicant, but in future (as reported in our Parliamentary columns this week) this payment will no longer be asked. Applications should be made through a doctor and not by the patient himself.

Prof. H. P. HIMSWORTH has been appointed a member of the Medical Research Council.

1. *Planning*, 1948, **14**, no. 279.
2. See *Lancet*, 1947, ii, 879.

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Special Articles

AGED SICK NURSED AT HOME

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MANY old people dread a long illness, knowing that it is liable to strain beyond repair their domestic arrangements and may well involve the disruption of their home. The present paper is based on the experience of a series of old people receiving regular domiciliary nursing care in Glasgow from the Queen's Institute of District Nurses. Few of this group of patients were in receipt of public assistance, though in many cases living conditions were very difficult. In a sense this series is complementary to another drawn from the experience of the Glasgow outdoor medical service and described by Curran et al.[1]

Of 300 persons studied, 62 were men and 238 women. All fell within the age-limits usually adopted in dealing with "old" people—over sixty years of age in the case of women and over sixty-five in the case of men. The preponderance of old women is in agreement with common experience:

Age (yr.)	*Men.*	*Women*
60–64 ..	0 ..	25
65–69 ..	13 ..	37
70–79 ..	33 ..	117
80 + ..	16 ..	57
Not stated ..	0 ..	2
Total ..	62 ..	238

A third of the men were widowers, and two-thirds of the women widows.

Of these old people 173 were Glasgow-born, 88 had come from other parts of Scotland, 17 from England, 19 from Ireland, and 2 from abroad.* The average duration of stay in the city of the 126 "incomers" reached the remarkable figure of forty-seven years, and only 8 of them had lived in Glasgow for less than twenty years. These figures suggest that the incomers who continued to stay in the city in their advancing years were mostly those who had come to it in early life.

The chief causes of invalidism among the 62 men were suprapubic cystotomy (14), cerebral hæmorrhage and hemiplegia (11), heart disease (8), cancer (7), and "senility" (6); among the others were rheumatism (3) and diabetes (2). Among the 238 women the chief causes were diabetes (50), "senility" (46), cerebral hæmorrhage and hemiplegia (29), heart disease (19), rheumatism (18), and ulceration of the leg (15). All the men, and 42 of the 46 women, classified as suffering from "senility" were over 75 years of age.

Fewer than a quarter of the patients had been ill for less than six months, and of these illnesses nearly half were cardiovascular; only 2 of the 40 cases of cerebral hæmorrhage and hemiplegia had required nursing care for more than five years. In nearly half the cases the duration of illness was more than three years, and a seventh of the patients had been ill for more than ten years. The most frequent causes of illness of more than ten years' duration were diabetes and rheumatism.

HOUSING CONDITIONS

The housing of these old people presented several points of interest: 91 of the patients, living in ground-floor rooms, did not require to climb stairs; 93 lived on the first floor, 63 on the second floor, and 53 on the third floor. Of 21 patients with rheumatism 11 had to climb at least two flights of stairs, and so did 12 of 27 patients with cardiac disease. Most of these patients could get about only with great difficulty, if at all, and many could not negotiate stairs.

Many of the houses were unsuitable for old people. Thus, only 103 of the 300 patients lived in houses which had a bathroom and an inside lavatory, 84 in houses with an inside lavatory but no bath, and 110 in houses with neither bath nor lavatory inside the house.* Of 52 incontinent patients, 18 lived in houses which had an inside lavatory but no bath and 18 in houses that had neither bath nor inside lavatory; 38 of the 52 had a room to themselves, 10 shared a room and a bed with husband or wife, and 4 shared a room with some other relation, 3 of the 4 sharing a bed.

Housing conditions in relation to crowding of the 300 patients covered by the survey are summarised in table I. It is an interesting fact that the incontinent old people were commonly found in houses where overcrowding was greatest.

TABLE I—HOUSING CONDITIONS OF OLD PEOPLE

Housing conditions	*All patients*	*Incontinent patients*
Worse than 1 room per person	97 (*32%*) ..	24 (*46%*)
1–2 rooms per person ..	153 (*51%*) ..	25 (*48%*)
Better than 2 rooms per person	50 (*17%*) ..	3 (*6%*)
Total ..	300 ..	52

Where circumstances had broken up the home, the most common cause was unfitness of the old people; disruption of the family was less important, and poverty played a minor part.

EMPLOYMENT AND RECREATIONS

None of these old people was fit for remunerative employment. Of the 62 old men, 50 had given up work because they were no longer fit for it, 1 because he was unable to travel to work, and 1 because he could not find suitable work. Most of those compelled to give up work did so in their sixties and seventies; 8 old men voluntarily retired from work, all being over the age of sixty at the time of retiring. Two-thirds of the women had given up remunerated work on marriage, 6 had retired in later life, and smaller numbers had stopped work for various reasons; only 1 gave as her reason for leaving work the need to care for other members of her family.

Of the 62 old men, 38 professed to have no recreations, hobbies, or interests; 10 gave reading as their chief entertainment, and 6 retained an interest in sport. Of the women, 156, including 33 diabetics, had no hobbies; 60 were interested in reading and/or knitting. Only 3 of the old people said they were interested in radio, but not many of them had access to a wireless set.

NURSING LOAD

Of the 300 patients, 107 were wholly bedridden, 106 partially bedridden, and 87 able to be up, though many of them had little freedom of movement. The conditions from which the wholly bedridden patients suffered were chiefly: "senility" (28), cerebral hæmorrhage and hemiplegia (24), heart disease (12), rheumatism (12), and cancer (10). Only 2 diabetics were wholly confined to bed. Of the 87 patients able to be up, on the other hand, 38 were diabetics and 11 suffered from "senility."

Of the 52 cases of incontinence, 24 were of urine only, 3 of fæces only, and 25 of both urine and fæces. Of these 52 patients 17 were senile, 15 had cerebral hæmorrhage or hemiplegia, 5 heart disease, 3 rheumatism, 3 cancer, and 2 disease of the nervous system.

In 130 cases the patients had to be washed by the district nurse, including 36 patients who could not feed themselves. Of the 130 who had to be washed, 32 were senile, 30 had cerebral hæmorrhage or hemiplegia,

1. Curran, M., Hamilton, J., Orr, J. S., Poole, W., Thomson, E. N. *Lancet*, 1946, i, 149.
* Remainder "not stated."

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19 heart disease, and 17 rheumatism. Of the 36 patients who could not feed themselves, 10 were senile, 13 had hemiplegia, and 4 heart disease.

In 52 cases the patients were confused in mind, and 10 patients had more serious mental impairment. An abnormal mental state was associated with a diagnosis of "senility" in 23 cases.

Seriously defective vision was found in 52 cases and seriously defective hearing in 40; in 14 of these cases the patient was both blind and deaf.

The total volume of serious invalidism was therefore very considerable and the nursing load heavy, as shown in table II.

TABLE II—DISABILITY AMONG 300 OLD PEOPLE UNDER TREATMENT IN THEIR OWN HOMES BY QUEEN'S NURSES

Condition	No. of cases	Bed-ridden		Incontinent	Unable to		Mental condition		Seriously defective	
		Wholly	Partially		Wash	Feed	Confused	More seriously impaired	Vision	Hearing
Heart disease ..	27	12	11	5	19	4	5	1	4	2
Cerebral hæmorrhage and hemiplegia ..	40	24	11	15	30	13	12	4	5	7
Diabetes ..	52	5	9	1	3	1	2	0	19	2
"Senility" ..	52	28	13	17	32	10	21	2	14	12
Rheumatism ..	21	12	9	3	17	3	1	1	2	2
Cancer	17	10	5	3	8	3	2	0	2	1
Suprapubic cystotomy ..	14	2	8	1	3	0	1	0	0	0
Accident ..	10	1	6	0	2	0	1	0	0	1
Respiratory disease ..	9	2	6	0	3	0	0	1	0	3
Others	58	11	28	10	13	2	7	1	6	10
Total cases ..	300	107	106	52	130	36	52	10	52	40

WHO LOOKS AFTER THE AGED SICK AT HOME?

Apart from the ministrations of the district nurse, 78 of the 300 old people looked after themselves; these included 23 diabetics and 11 with ulceration of leg. Not all of this group could care for themselves in any satisfactory way, but all were anxious to lead independent lives.

Case 1.—Widow, aged 73. Lives alone in a room on first floor. Cerebral hæmorrhage a year ago; now recovering and able to be up for part of the day, but is very shaky when up and is in need of someone to be with her. She struggles to do her own shopping, preferring, though she has five sons and five daughters, to keep her own home and have her family visit her occasionally.

Case 2.—Married woman, aged 76. Diabetes. Lives with husband (76) in a two-roomed house. Her hearing is defective, her vision already seriously defective and rapidly becoming worse; she is teaching herself braille and is already proficient.

Their husbands cared for 23 old ladies, and their wives for 24 old men. The partner undertaking the attendance was often in indifferent health, but both were anxious to keep the home together if at all possible.

Case 3.—Married woman, aged 72. Diabetes, with gangrene of foot. Wholly bedridden: vision seriously defective. Cared for in second-floor tenement house by husband (72), who has high blood-pressure and is almost blind.

Case 4.—Married woman, aged 79. Bronchitis and senility. Wholly bedridden; confused; vision and hearing defective. Husband (75) looks after patient and does shopping and cooking; daughter visits periodically to clean the house.

Case 5.—Married man, aged 73. Cardiac disease and amputation of both legs. Has been ill for five years. Wholly bedridden; mentally confused: vision and hearing both seriously defective. He is cared for by his wife (68) but he is very heavy to move, and his wife, who has gastric trouble, is not fit for heavy lifting. A daughter, the breadwinner, is out at work all day.

In 147 cases such care as was provided came from some other relation, sometimes residing in the house, sometimes visiting daily.

Case 6.—Married man, aged 82. Hemiplegia of two years' duration. Wholly bedridden and requires assistance in feeding; incontinent, both urine and fæces; mentally confused; seriously deaf. Wife (83) wholly bedridden with rheumatoid arthritis; both looked after by a daughter who therefore cannot earn her own living. This daughter is not strong and is subject to fainting attacks; the other daughter goes out to work but has to share night nursing and often gets little sleep.

Case 7.—Widow, aged 73. Carditis, bronchitis, and prolapse of uterus; both legs œdematous; both buttocks covered with bedsores caused by incontinence and vaginal discharge; infection of the eyes. Lives alone in two-roomed house. Should be in hospital and certainly requires someone with her constantly, but has to depend on casual help from neighbours and distant relations, none too trustworthy. A corporation nursing sister calls to treat patient's eyes.

Case 8.—Widow, aged 89. Senile debility. Son lives with her and cooks a meal when he returns from work. There is no woman to help in the home, and the old lady lies alone all day helpless in bed while her son is out at work.

Sometimes the patient went to live with relations. This arrangement usually worked reasonably well but was not always a very happy solution from the point of view of either patient or relation.

Case 9.—Widow, aged 72. Hemiplegia; wholly bedridden and incontinent. Lives with a married daughter who feels her mother is rather a burden. Patient is depressed, lonely, and unhappy, and says that no-one wants her, and that she is a burden on the family.

Case 10.—Widow, aged 84. Senility; confined to bed for three years. Gave up own home because unable to look after it and now lives with a daughter who cares for her well. Patient is mentally defective, could never read or write, and worked as a farm servant until she married. She is now incontinent, partly bedridden, and can walk only a little with the aid of a stick. The old lady is quite happy, but the daughter is not keeping well and sometimes feels unable to carry on.

In 21 cases the old people depended on the care of friendly neighbours, not relations, and 16 of these patients were wholly bedridden.

Case 11.—Single woman, aged 65. Rheumatoid arthritis. Partly bedridden, can walk with a stick from room to room. Lives alone on second floor and cannot get downstairs; is finding increasing difficulty in housework and cooking. She relies on neighbours for doing her shopping and has to pay for their service.

Case 12.—Widower, aged 85. Lives alone in a single, badly lighted, draughty, unfurnished room absolutely devoid of home comforts and with very few bedclothes. Senility. Wholly bedridden; can feed himself but cannot wash. Incontinent, mentally confused. This old man is very neglected. He has looked after himself for ten years, depending on neighbours for washing and occasional mending.

Case 13.—Single woman, aged 62. Rheumatoid arthritis. Worked as dressmaker and lady's maid until eight years ago, when had to give up because of disability. Now lives in one room on a second floor, wholly bedridden. A neighbour attends to her and comes in to sleep in another bed in patient's room.

Occasionally an aged invalid with no home of her own can find lodgings, often under conditions grossly unsuitable.

Case 14.—Single woman, aged 74. Rheumatoid arthritis. Wholly bedridden; cannot walk. Lives in one room of a house whose owner lets rooms to sick and infirm people. Financial circumstances good and room comfortable, but patient not happy because she knows she cannot stay there permanently and worries about her future; her relations do not want her in their homes.

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Case 15.—Widow, aged 72. Diabetes, with amputation of leg. Has been ill for thirteen years, when her husband died, also of diabetes. Her six children died in infancy, and she has lost trace of all relations. She is in lodgings in the basement of a tenement house; her landlady has cared for her during her years of illness. Patient has a room to herself but is wholly bedridden, incontinent, and with seriously defective vision. The house is unsuitable: it has an inside W.C. but no bath or wash-basin, only a sink in the kitchen. There are other lodgers.

COMMENTS

The chief impression left by a study of these cases is of the formidable mass of heavy nursing care which they represent and of the difficulties inherent in their living conditions, often almost unbelievably bad. Some patients are in a state that no self-respecting society can allow to continue; and there is no reason to believe that Glasgow is unique in this matter. Many of these old people can only be treated satisfactorily in hospital, but there is often great difficulty and long delay in securing admission to hospital, alike for the comparatively acute and the frankly long-term case. Lack of adequate home care on discharge from hospital is a common cause of early breakdown, calling for readmission to hospital. There is the further complication that sometimes old people are unwilling to go to hospital, however great their need, fearing that to do so will involve the irretrievable disruption of what home is left to them.

These seriously disabled people, many of them living in dreary squalor, represent the most compelling of all the problems of old age. What can be done to improve their lot? For some the removal from existing conditions to a small residential home of sympathetic atmosphere seems to be the only practicable course, even if it involves some pulling up of roots. Any such provision should not involve the separation of husband and wife. For others it is essential to develop some form of home-help service on an organised and paid basis to assist the old people to look after their affairs. The amount of call on such a home-help service will obviously depend on individual circumstances; for some patients help with the weekly washing may suffice, for others help on two or three half-days a week, for others an hour or two daily.

It should be possible to organise a service of this kind in such a way that the home-helps enrolled in it are assigned duties, whole-time or part-time, with ailing old people in their own neighbourhood. A service of this kind may be necessary in some cases to supplement the resources of relatives. Many aged invalids, at present depending on the kindly help of neighbours, place on these neighbours a load which it is unreasonable to expect them to bear. That is not to say that there is not a great place in the case of old people for voluntary effort and voluntary service, which, however, should not be allowed to develop into an intolerable burden. The nursing care of these old people by the Queen's Institute of District Nurses affords a notable example of what can be achieved under unpromising conditions, given an organisation imbued with the spirit of service, and it should be possible to develop a home-help service along somewhat parallel and complementary lines.

As a long-term policy, the approach to the welfare of old people must clearly be much more positive in outlook, directed to the promotion of healthy living, the conservation of active interest, and the prevention of invalidism; but in the meantime the wretchedness of many decrepit old folks, dragging out a miserable existence under conditions that can only be described as shocking, is unworthy of a civilised society.

I should like to thank Miss Ormiston and her staff of nurses, who have made the preparation of this paper possible, and Miss Kay, of the Glasgow Public Health Department, for her help with the statistical analysis.

IMMUNISATION AGAINST TUBERCULOSIS

IN opening a discussion at the pathology section of the Royal Society of Medicine on Feb. 17, Prof. K. A. JENSEN (Copenhagen) said that the first B.C.G. strain which he received from France in 1927 was too virulent for use in human beings, in whom it could produce ulcerative skin lesions that took months to heal; indeed, in this respect and in its virulence by intracutaneous tests in the guineapig it was very similar to lupus strains of the tubercle bacillus. Incidentally, he has shown that pure "rough" variants with the characters and virulence of the B.C.G. strain can be derived from bovine strains during subculture. A second strain received in 1931 was much less virulent and in his personal experience did not produce any abscesses after superficial intracutaneous inoculation in 281 adults, 280 of whom gave positive tuberculin reactions six weeks afterwards. This vaccine may, however, produce more severe reactions in infants because of the difficulty in giving the material wholly intracutaneously. Thus, of 385 infants under a year old, 6 developed local abscesses and 7 adenitis, a complication-rate of 3·4%, whereas of 2956 older children only 16 developed abscesses and 9 adenitis, a complication-rate of 0·8%. It is also more difficult to render infants tuberculin-positive after B.C.G. vaccination and a larger dosage of vaccine is recommended for them.

As to the protective effect of B.C.G. vaccine, Professor Jensen referred first to guineapig experiments; the non-immunised animal shows little initial reaction to lung invasion by the tubercle bacillus, which is allowed to multiply in endothelial cells for six to seven days. Only when the allergic state develops is there an inflammatory reaction, usually followed by necrosis; in the necrotic material the tubercle bacilli survive and multiply, and secondary spread occurs by the lymphatics to the regional lymph-glands or by the alveolar ducts to neighbouring alveoli. In the immunised guineapig, on the other hand, the sensitised lung cells respond immediately to invasion by the tubercle bacillus and the invader is usually destroyed before necrosis can occur. That a similar protective mechanism may develop in man as a result of immunisation with B.C.G. was illustrated by an outbreak of tuberculosis in a Danish secondary school.

In December, 1942, it had been established that of the 368 pupils in the school 130 were naturally tuberculin-positive, 134 B.C.G.-vaccinated children were tuberculin-positive, and there were 105 tuberculin-negative reactors. In January, 1943, an influenza-like epidemic broke out almost explosively in the whole school, and in the follow-up it was found that, of 70 tuberculin-negative children who had now become tuberculin-positive, 55 had had the influenzal attack and 41 (59%) presented either positive X-ray findings in the lungs or tubercle bacilli in the gastric lavage; 6 of them later developed progressive pulmonary tuberculosis and 1 died; 8 had erythema nodosum, 10 pleurisy, 1 pericarditis, and 1 peritonitis. Of the 134 B.C.G.-vaccinated children none showed initial symptoms but 2 cases of pulmonary tuberculosis appeared about a year later, while there were also 2 cases among the naturally tuberculin-positive children. The cases of progressive tuberculosis occurred almost exclusively in pupils aged between fifteen and eighteen years.

Summing up his personal experience Professor Jensen said that provided B.C.G. is prepared with the utmost care and the inoculations properly carried out there should be no risk or discomfort to the patient. Natural resistance is the predominant factor in the struggle against tuberculosis, but B.C.G. vaccination can increase the resistance, and, if conditions are not too unfavourable, can help to protect the individual against the infection developing into progressive tuberculosis. He was, however, sceptical of the value of B.C.G. vaccination in countries where people are malnourished and where the risk of massive infection is high.

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THE VOLE BACILLUS

Dr. A. Q. WELLS described briefly the characteristic features of the vole bacillus, which because of its natural habitat he prefers to call the murine strain of tubercle bacillus. It was established experimentally that a live vole-bacillus vaccine produces a non-progressive lesion in various animal species—guineapig, rabbit, cattle—and that in the guineapig the resistance induced to subsequent infection is equal to or greater than that induced by B.C.G. vaccine. Dr. Wells described his personal experience with the inoculation of this vaccine in man by subcutaneous, intradermal, and multiple-puncture methods. Subcutaneous inoculation in 48 people of varying ages produced local reactions in all, with in most cases ulcerative lesions up to 3 cm. in diameter, and although all were tuberculin-positive within four weeks and were still positive after a year, the severity of the local reaction precluded this method for large-scale trials. Intradermal inoculation was tried in only a few people, but 79 older boys and young adults were chosen at random from a large number of tuberculin-negative reactors in an institution for inoculation by multiple puncture. The technique is to place a disc of filter-paper soaked in 1–5 mg. of the vaccine on the upper arm, place the perforated plate of the multiple-puncture instrument firmly on top, and then, by releasing a spring, puncture with many needles through the filter-paper into the skin. Little or no pain is felt. The reaction takes the form of small red papules which persist for one to three months, leaving behind some shotty thickening of the skin but no ulceration and no regional adenitis. In this group 73 of the inoculated were tuberculin-positive at nine weeks; all were positive at thirteen weeks and remained so for an observation period of thirty-two months; while 36% of a control group became tuberculin-positive in that time.

Dr. Wells was convinced of the safety of the vole-bacillus vaccine in man, and felt that it has this advantage over B.C.G.: that since its virulence for the natural host can be maintained at a steady level, the vaccine is likely to be a more stable antigen than B.C.G., which cannot be accepted as a "virus fixe."

CONTROL OF TUBERCULOSIS IN CATTLE

The value of B.C.G. vaccination in the control of tuberculosis in cattle was discussed by Prof. T. DALLING. The vaccine produces in calves a non-progressive infection and raises their resistance to virulent experimental infection introduced either intravenously or by mouth. Intravenous injections of the vaccine are more satisfactory than subcutaneous or intradermal inoculations which often result in abscess formation. A positive tuberculin reaction can best be maintained by intravenous injections at six-monthly intervals of 50 mg. of a wet culture from the surface of solid egg-containing media.

Of two field trials, the first and smaller was completed. Here, 47 calves were placed on four farms where the incidence of natural infection was quite high. Calves were given 100 mg. of vaccine intravenously before going on the farms and then 50 mg. six-monthly. Only 23 of the vaccinated animals were available for study at the end of the trial, and 6 of them had non-progressive tuberculosis whereas 61 of 116 control "contacts" were infected and of these 19 had progressive tuberculosis.

The second trial was much more extensive and run on different lines. Calves born on farms with a high incidence of natural tuberculosis were tuberculin tested and if negative were given inoculations of 50 mg. B.C.G. intravenously at six-monthly intervals. There were a number of deaths and delayed reactions with loss of weight following the injections, occurring after the first or any of the subsequent inoculations. The calves were not wittingly exposed to infection until they reached maturity, when they gradually replaced tuberculin reactors in the herd. There were no control unvaccinated animals. Of 73 herds, involving some 5000 cattle, 27 have completed the trial—that is, all the animals have been vaccinated and have lost their sensitivity to tuberculin, so that the farm now has a registered T.T. herd. A further 19 herds have completed the trial and await the final tuberculin test before registration.

It seems, therefore, that this method may be useful in eradicating bovine tuberculosis from herds of cattle over a period of time. The experiment bears a resemblance to the method adopted with considerable success for the control of tuberculosis among the inhabitants of the island of Bornholm, and may suggest another mode of attack in the successful fight which man is waging against tuberculosis.

NEW ZEALAND

FROM OUR OWN CORRESPONDENT

Dr. R. S. Aitken, who has been appointed vice-chancellor elect of Otago University, Dunedin, expects to leave his present post of regius professor of medicine at Aberdeen in August. All the four university colleges in New Zealand are appointing full-time principals (or vice-chancellor in Otago). Sir Thomas Hunter is the principal in Wellington, and Dr. Hulme has been appointed to Canterbury College, Christchurch. The appointment in Auckland has not yet been made.

Last January the senate adopted a report on medical education which recommended the continuance of the present limit of admission of 120 students per annum, with a quota system for the various centres. The General Medical Council's recommendation of 5 terms for anatomy and physiology, with a subsequent term introductory to clinical work, was also adopted. The present distribution of final-year students to the four centres, without substantial development of teaching facilities in any one of the other centres, was confirmed. A hospital year after graduation and before full registration was to be sought from the Medical Council. Postgraduate education was left very much in its present elementary state. These decisions were not uncontested. Some thought it wrong to deny to properly prepared students the right to study medicine; some wanted the final-year students—some half the students in each clinical year—massed in one centre away from Dunedin under professorial teaching units; and some wanted a major development of postgraduate effort and clinical research also under university units in another centre. All these things, however, were denied, and the committee on medical education was dissolved.

POLIOMYELITIS EPIDEMIC

During the past three months there have been about 160 cases of poliomyelitis, including 120 in the Auckland district. There has been an unusually large proportion of cases with encephalitis and also with muscle spasm, but a low proportion with serious paralysis. There have been 7 deaths. On Dec. 1 the Health Department closed the schools and swimming-baths, and banned gatherings of children and swimming on city beaches. In spite of a blazing summer, these precautions have been well observed. Whether respect for authority or fear of the disease counted most is hard to say. Schools may possibly reopen in the South Island early in March. Since the end of December cases have been less severe, suggesting a decline in virulence.

Since early in January Kenny technicians have been working in the Auckland Hospital alongside the regular physiotherapists, sharing the patients. All cases have made good progress. The outstanding feature in treatment has been the success of hot packs in relieving muscle spasm and pain in the early stages.

OVERSEAS TRAVELLERS

Mr. W. S. Robertson, orthopædic surgeon of Wellington, was sent to the United States in December by the government to look into matters connected with poliomyelitis. Mr. Douglas Robb, thoracic surgeon of Auckland, is also visiting the States and Britain at the government's request, to study cardiac surgery with particular reference to Blalock's operation for pulmonary stenosis. A clinic for congenital heart diseases is to be set up in Green Lane Hospital, Auckland, to receive cases from all parts of New Zealand.

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In England Now

A Running Commentary by Peripatetic Correspondents

"I CAN'T understand it," said the Professor. "Now, when there are hundreds of candidates for every medical appointment at home, we have had a mere handful of applicants for those posts abroad, and none was the least suitable. The jobs offer immense opportunities for experience and research and are well paid too, and give one fine opportunities for gaining experience and doing research."

"The reason is simple," said the Clinician drily. "All young men know that if they go abroad they pretty well wipe off their chances of ever getting a post at home. They may be keen to work in the tropics for a few years, but they also want to settle down in England afterwards to raise a family. When that time comes they will be out of touch; their contemporaries and juniors will be adhering firmly to every rung, and the Big Few who control academic destinies will have forgotten them. Those who aspire to chairs or the directorship of an institute should stay here, attend meetings of as many societies as they can, be good committee-men, avoid controversy, and be properly respectful to the Great."

"Such cynicism," said the Traveller; "and all too true. Yet wherever one goes, in our sphere of influence abroad, medical work needs more top-grade men. The only good youngsters who go out are the ones who mean to stay. But there aren't enough of them, and they don't come back to give us the benefit of their experience and wider outlook. The experience they gather is often terrific—perhaps even a bit terrifying. One young gynæcologist had fifteen cases of ruptured uterus brought into his wards the first year he was with us; and all along the line it's the same." "Ah, yes," said the Professor, "I expect you're right. But what's the solution?" "Adoption and secondment," replied the Traveller. "Every school and research institution should link up with one or more similar shows abroad and exchange junior (and for that matter, senior) staff. One, three, five years—it could vary with circumstances—but men would know they could come back without having to get into a dog-fight or being forced into undignified toadying. All that is needed is a little good will and interest." The Clinician sighed. "In this cold weather," he said, "good will and interest are in short supply. How nice it must be in the tropics—even apart from the clinical material."

* * *

To those of us who have never been out of Europe, America seems as remote as the moon—even a bit remoter, for we have seen the moon. So it was a bit of a shock when I got home the other evening to be told that Milwaukee wanted me on the phone and would I ring the Overseas Telegraph Service in London and ask for reference number 253661?

We live, I should explain, in one of the truly rural villages of Kent, so I was afraid there would be trouble with our local exchange. There was. The lady on duty had never heard of the Overseas T.S. but she would give me Telegrams. "Hullo," said a voice, "this is Sevenoaks Telegrams." I told him I wanted the O.T.S. for an American call. "Ah, you don't want Telegrams," he said, as one making things simple for a child, "you want to ask your exchange for the O.T.S. in London." I began to tell him I'd already done that, but he was gone. I rattled the receiver and did as I was bid. With remarkable smartness our local lady connected me up again with Telegrams in Sevenoaks. He seemed glad to hear from me once more and this time suggested I should dial 91. I told him we hadn't any dial so he thought my best line was to ask the local exchange for the O.T.S. in London. I was getting a little hot under the collar by now, and may have said my piece a bit harshly this time. Anyway, the local girl said she would put me on to Inquiries. This wasn't so easy; Inquiries must have been out to supper and it took ten minutes wur-wurring to get them back. Finally they came and I told my story once more. Their advice, a trifle stale to me by now, was to ask my local exchange for the O.T.S. and to tell them to dial 91. At this there was a snort from the local lady, who had been listening in: "Inquiries has told you all wrong," she said haughtily; "they've given you quite the wrong advice; I'll ask the supervisor," and there was some muffled argument off stage.

I had given up hope by now, and felt that nothing short of a miracle would get me connected with Milwaukee. But at this moment the miracle happened. A distant new and confident voice suddenly butted in with "Is that Bolton Green 287? Milwaukee wants you. Hold on." To my incredulous joy there was the rushing sound with high-pitched morse superimposed that I know well from trying to get America on my wireless. Then for ten minutes, Mr. O.T.S. (for it was he all right) called "Hullo New York, hullo New York, hullo New York . . ." over and over again. There wasn't a sign of a reply, but I didn't mind. This was the real thing at last.

I don't think we ever got New York, for suddenly there was another divine intervention, this time from Milwaukee itself, and within ten seconds we were connected. I doubt whether my friend heard a word I said, but I heard quite a few of his, and after all, he was paying the £5 for three minutes.

* * *

When one is almost completely bald there is a sense of unreality about sitting an examination, even a Very High Degree Indeed. And this is encouraged by one's reception in College. The Provost, notoriously vague about anything unconnected with the classics, dispenses port with a liberal hand and inquires if one enjoys examining. He professes astonishment when told the boot is on the other foot. After it is all over the Head Porter looks a little pained and suggests tactfully that there must have been a mistake somewhere. How right he is. Furthermore, one's children, with that stark candour so characteristic of the first decade of life, rub salt into the wound by confiding reproachfully to their stuffed animals that Daddy's failed again. We may protest that the result is immaterial, that most of the examiners themselves are without this proud distinction, and that nobody thinks much the worse of you for failure—yet inevitably, after the toil and blood and sweat of the whole affair, the tears are just as real and bitter as they were the time before.

And that is no doubt why the examination is conducted on a plane of altogether unusual good fellowship. My question as to its date received the perplexing reply that it began on the first Tuesday after the Division of the Lent Term. A cup of coffee is traditionally offered to candidates during the written papers, and of course one may smoke. In the vivas a couple of rubicund ex-admirals inquire softly, "Would you care to examine some patients, Mr. Hogarth?" And not to be outdone in civility an ex-general observes, "I appear to have discovered a slight gap in your knowledge." Even the expected rancour of one much-feared examiner is more than compensated by the gentleness of the rest. But above all, the recollection that lingers, the apotheosis of politeness, is the apologia of the Regius himself. "I am afraid, gentlemen," he says, a tear starting in his eye, "I am afraid that it is a *very* small pass. But," he adds hastily, "I do hope you will all take it again next year." And how can one refuse an offer couched in such terms?

* * *

One of the latest admissions to the antenatal ward was paying great attention to the discussion at her bedside during the staff round. Guessing rightly that the word toxæmia was being applied to her own condition, she could contain herself no longer and burst in on our academic deliberations with: "Well fancy that! I live in the same house as a psychiatrist and *he* had toxæmia last winter. We share the same bathroom, too." Perhaps the lady is no further than the rest of us from solving the mysteries of the "disease of theories."

* * *

She was over seventy and said she would like a "sustifikit." "Oh yes, Mrs. A," said I, "which one were you wanting? I've got a hundred of them." But she didn't know! The woman next door had said she ought to go to her doctor and get a sustifikit—so here she was. Which one would you give the dear old soul?

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Letters to the Editor

TUBERCULOSIS

SIR,—The salient points in the problems of tuberculosis, as it affects the British community, are these:

1. Tuberculosis has contributed greatly to the shortage of industrial man-power. In the age-group 15–50, which is vitally important to our productive effort, it causes far more deaths than any other disease.

2. Throughout the country half the deaths from pulmonary tuberculosis occur within a year of notification, a small proportion of these deaths being unnotified. R. R. Trail estimates that some 80% of sanatorium admissions are advanced cases.

3. The prognosis of the sputum-positive case was shown by Brian Thompson to be grave: "Of any eight patients with positive sputum only two would be expected to survive five years and one to survive ten years." A recent summary by W. H. Tattersall has shown approximately the same survival-rates.

Mass radiography was introduced to the civilian population a few years ago for the express purpose of reducing delay in diagnosis. At that time extravagant claims were made for the results we might expect. As at present used, however, it cannot solve the problems outlined above. It is being administered without reference to the epidemiology of phthisis (progressive pulmonary tuberculosis) or to the clinical features of the most important group of sufferers from this disease.

The steady decline in mortality and morbidity since 1850 has resulted in an increasing incidence of *primary* infections in early adult life and even in middle age. This postponement of infection, which began to operate about 1910, is responsible for the present problem of adolescent phthisis; for it has been shown that phthisis arises three times more frequently in Mantoux-negative adults than in those previously exposed to the infection in childhood. With few exceptions (e.g., an overwhelming miliary tuberculosis) those undergoing primary infection in adult life will all show Mantoux conversion; but they may otherwise be divided into three groups, according to individual resistance:

1. Those with good resistance may never show any radiological abnormality (in the lungs), or may later have calcification in the parenchyma or at the root.

2. Those with moderate resistance may show a radiological shadow, usually minimal and unaccompanied by symptoms. At the inception of mass radiography it was thought that these were the cases that would shortly develop manifest phthisis, but it is now becoming apparent, as has been obvious to tuberculosis physicians with experience of contact examination, that only a minority do so. In many the shadow gradually clears, or it may remain stationary for years.

Routine mass radiography detects numbers of these cases, but their discovery does not remove the delay in the diagnosis of manifest phthisis.

3. Phthisis (progressive pulmonary tuberculosis) arises predominantly in the third group—those with little resistance. Twenty years ago Rist drew attention to the frequency of its acute onset in a patient who may have presented a perfectly normal X-ray appearance on routine examination only a few weeks before.

We are beginning to realise that a large proportion of all cases of phthisis are a direct consequence of primary infection, and that the destructive form, with a poor prognosis, generally appears within a year of such infection.

Frostad [1] found that slightly more than 10% of cases of Mantoux conversion were symptomless, while the remainder (85% or more) nearly all had symptoms of short duration. Usually the clinical disease of the lungs commenced with large infiltrations (more than 20 mm. in diameter), arising in any part of the lung fields below the clavicles, and appearing as soon as three months after the last negative tuberculin test. I depicted such a case in my handbook, *Pulmonary Tuberculosis and the General Practitioner*, illustrating well-marked infiltration and excavation in a lung which had presented a normal radiological appearance only three months before. The following is another excellent example:

A man, on demobilisation from the Navy in October, 1946, was mass-radiographed with a perfectly normal result. Soon after this he began work as a labourer. Early in December he started to cough and complained of languor. During the first week in January, 1947, he was referred to hospital by his own practitioner. He had ceased work on Jan. 7, because of illness, and a few days later he was found to have extensive infiltration with excavation in the region of the right clavicle. Sputum was positive and temperature was 102·4°F.

Mass radiography of the "normal" population at shorter intervals would not reveal such patients; they would be absent from work under the care of the general practitioner.

This country is in the midst of an economic crisis, and cannot afford to spend money on numerous units engaged on work of doubtful value. Far from being the most effective weapon so far evolved for the fight against tuberculosis, mass radiography, as at present administered, is apt to create a false sense of security both in patients and in general practitioners. E. K. Pritchard and I hope shortly to describe instances where a normal film has caused delay in seeking advice and has been responsible for misleading the practitioners when finally consulted.

Miniature mass radiography is an excellent technical achievement, but its use could best be devoted to the following groups:

1. Those with any symptoms suggesting possible disease within the thorax.
2. All hospital admissions, inpatient and outpatient.
3. Familial or other contacts of open cases of tuberculosis.
4. Expectant mothers.
5. Those exposed to noxious dusts or other particles.
6. Entrants to the Armed Forces.

A wide field exists also in preventive research, embodying tuberculin-testing of school leavers, and active immunisation. Those showing Mantoux conversion following recent primary infection should be brought under repeated radiological control. There is little use in mass radiography of numbers of Mantoux-negative school leavers as practised at present.

I emphatically agree with "Tuberculosis Officer" (Jan. 17) that the early diagnosis of phthisis must always be sought through the vigilance of the general practitioner, to whom the most extensive diagnostic facilities must be granted. At the same time there is great scope for education of the public in the nature and early manifestations of phthisis, together with complete reorganisation of undergraduate and post-graduate instruction in tuberculosis.

Arrangements for the institutional treatment of this disease have completely broken down throughout the country. Infective cases are being left in their homes for months on end, and it is becoming common to find a second case in the family before the first has been admitted for treatment. This is not preventive medicine.

Maclean and Gemmill (Jan. 31) are to be congratulated on their efforts to get over the difficulties of treatment without beds. Pritchard has described (Feb. 21) how we were led to start domiciliary treatment in South London, and since my transfer to Willesden I have used such methods more extensively and have formed a high opinion of their value in selected cases. There is not the slightest doubt that in the early case disease can often be healed and the patient returned to work after domiciliary collapse therapy, combined preferably with brief stays in hospital for such procedures as adhesion section. As Pritchard says, protracted bed rest should be an essential feature of domiciliary treatment. Such methods not only help the sufferer but also tend to prevent the spread of infection.

With the prevailing complacent attitude towards the appalling situation of tuberculosis, it will be many years before patients can again be assured of institutional accommodation. The community should decide whether in our present economic difficulties we can afford the annual wastage claimed by the tubercle bacillus. This wastage is preventable, but let us not once more put our faith in panaceas to raise the dead.

Willesden Chest Clinic, London, N.W.10. C. H. C. TOUSSAINT.

1. Frostad, S. *Acta tuberc. scand.* 1944, suppl. 13.

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SIR,—Impending changes in the tuberculosis service and increase of mass-radiography units may tend to draw attention away from the importance of carefully examining tuberculosis contacts and their home conditions. I feel that the figures of contacts examined at my clinic in 1945, 1946, and 1947 again emphasise the necessity, demonstrated by the Medical Research Council's Prophit survey, that all contacts of tuberculous persons should be examined radiologically and that in young people the examination should be repeated at least once a year while they remain in contact with sputum-positive cases.

It will be seen from the table that over 7% of contacts examined were found tuberculous and that the percentage remained fairly constant each year. Still more important, of this group of contacts found to be tuberculous no less than 16% showed no definite evidence of tuberculosis when first examined clinically and radiologically at the clinic.

Contacts	1945	1946	1947	Totals
No. examined	558	534	593	1685
No. found tuberculous	44	31	47	122
No. found tuberculous subsequent to first examination	..	..	..	21

J. WALLACE CRAIG
Senior Tuberculosis Officer,
Royal Northern Hospital and
Royal Chest Hospital.
London.

CHEMICAL COMPOSITION OF NORMAL URINE

SIR,—Professor Ryle said in his lecture on the Meaning of Normal [1]: "In medicine and the medical sciences the word 'normal' is in constant use but, as a rule, without a proper clarification of its meaning." This is especially true of the chemical composition of urine. In textbooks of biochemistry and physiology the components of normal urine are generally given in terms of "average numbers" or "the variation within normal limits." The reader, especially when he is a student new to physiology, may form the idea that small divergences from the normal must be considered as pathological. Obviously such a view may also influence the practical work of the physician.

In 1938 I published a paper [2] in which I suggested a different method of representing the chemical composition of normal urine. In healthy subjects the chemical components of urine are present in amounts which depend on the quality and quantity of food and on the conditions in which the subjects are living and working. In the healthy organism the chemical composition of body fluids remains constant within narrow limits, while the "normal" urine reflects variations in food consumption and living conditions; and urine which has a constant composition despite variation in food consumption and living conditions is pathological.

The statistical methods so important in consideration of the chemical composition of body fluids [1] cannot be used in a study of the chemical composition of urine unless the quality and quantity of food consumed and the living conditions of the subject are strictly defined; and this is very rarely possible in a person whose urine is being clinically examined.

To define the "normal" composition of urine, I have subdivided the chemical constituents into groups of the order of 10 g., 1 g., 0·1 g., and 0·01 g. in 24 hours' urine. The following table represents the composition of a 24-hour specimen of normal urine:

Amount in g.	*Substance*
1000 ..	Water.
10 ..	Urea, sodium chloride.
1 ..	Creatinine, uric acid, ammonia, potassium, inorganic sulphates, phosphates.
0·1 ..	Calcium, magnesium, amino-acids, glucose, phenols, ethereal sulphates.
0·01 ..	Protein, acetone bodies, purine bases, urobilinogen, indican, oxalic acid, &c.

Considering the constituents of the order of 10 g. or more, one can define the normal urine as an aqueous solution of urea and sodium chloride. If we consider the constituents present in urine in lesser concentration, we must enumerate potassium, creatinine, uric acid, ammonia, &c. In pathological urines the composition may be quite different; the glucose may be of the order of 10 g. (in diabetes mellitus); the amount of protein, usually of the order of 0·01 g., may be of the order of 1 g. or more; in ketonuria the quantity of acetone bodies may rise to the order of 1–10 g.—that is, one hundred times as much as in the urine of a healthy individual. The differences between normal and pathological urines should be expressed not in percentages of normal composition but in the number of times (e.g., ten or a hundred times) by which a given constituent is greater or smaller than it is in the urine of a healthy subject. Only such differences are of importance to the physician, so the methods used for the clinical analysis should not be too sensitive; the Molisch reaction for carbohydrates and the Spiegler reaction for proteins are too sensitive; with these methods all normal urines will give positive results.

These considerations should not be interpreted as meaning that accurate methods cannot be of use in the estimation of urinary constituents; where the food intake and the living conditions can be clearly defined sensitive analytical methods may give valuable information. In functional tests, such as urea-ratio tests, only accurate methods of urea estimation in blood and in urine can be applied; but in the routine clinical examination of urine it makes practically no difference whether one estimates the amount of protein in albuminuria by a method which gives approximate results or by an accurate chemical method; in the usual clinical examination of urine only the order—not the absolute amount of protein—is of importance to the physician.

I think that these views may be helpful not only to students but also to physicians, who must be able to differentiate between a normal and a pathological urine.

Department of Biochemistry,
Medical Academy, Gdansk, Poland.
W. MOZOLOWSKI.

1. Ryle, J. A. *Lancet*, 1947, i, 1.
2. *Polsk. Gaz. lek.* 1938, 17, 161.

RATIONS IN GERMANY

SIR,—In your issue of Feb. 7 (p. 233) you reported the answer to a Parliamentary question on the extent to which the ration scale in Germany had not been met in the previous three months. We repeatedly find that the actual conditions here are not known abroad, and as this is one more example of a statement not tallying with the facts I feel obliged, as a nutritionist, to bring to your notice these few observations.

In the present rationing system three separate factors must be considered: (1) the quantity of food theoretically provided in a given period; (2) the quantity which the normal consumer (called by us *Maximalverzichter*) was really able to buy in this period; and (3) the number of calories yielded by this amount of food (leaving aside the more important question of the fat and protein content). For the last four rationing periods (nos. 108–111), from Nov. 10 to Feb. 29, the following daily total of calories was officially provided for the normal consumer: 1414, 1226, 1189, and 1155. Included in this ration is 285 g. of potatoes daily; but anyone unable to procure and store the whole allocation before the winter began now usually receives none at all or only some 20% of the ration. The issue of meat is also in arrears, but this deficit may perhaps be made good. With potatoes that is not possible. Allowing for these deficits, for most normal consumers the calories yielded by the actual rations received for periods 108–111 are: 1259, 1071, 1033, and 999, daily.

These figures are calculated on the basis of official figures for the number of calories obtainable from 100 g. of a given substance; but the quality of many foodstuffs (bread, groceries, meat) has fallen very considerably owing to decrease of the fat content, inedible admixtures, and so forth; and so these tables are no longer valid. Chemical analysis shows that the calorie value of individual foodstuffs falls short of the official estimate by 10%, 20%, and even more. Taking this into account, the calorie value of the rations actually obtained by the normal consumer in the four periods was as follows:

	108	*109*	*110*	*111*
With 100% potatoes..	1291 ..	1124 ..	1086 ..	1022
With 20% potatoes ..	1135 ..	968 ..	930 ..	866

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The deficit between the amount received and the long-promised 1550 calories thus ranged from 320 to 395, and from 580 to 680 calories respectively, each day.

Perhaps I may add for those not closely acquainted with the circumstances, that the proposed 1550 calories is still far below the total laid down in May, 1946, by the Food and Agriculture Organisation for emergency subsistence. For subsistence the number of calories prescribed for the normal consumer is 1900 ". . . the point below which the consumption of no section of the population should fall if serious consequences are to be avoided."

We know that in England too the food situation is extremely difficult, and no-one here thinks that German rations should be improved at the expense of another nation's. Nor do we forget (as is often suggested) that we ourselves are responsible for our position. Nevertheless, we cannot believe that the world food crisis is still such that improvement of conditions is impossible. Thus we feel obliged to direct attention to the real facts of the terrifying food position. These cannot be countered by saying that each of us eats more than the official ration. For the normal consumer, obtaining the necessary "black" foodstuffs is much too difficult and costly to sustain health (everyone's vitality is sinking terribly); moreover, the moral consequences of this situation must be borne in mind.

Institute of Physiology, University of Göttingen. JÜRGEN ASCHOFF.

MISTAKES WITH INJECTION SOLUTIONS

SIR,—We agree with Mr. Dodd (Feb. 7) and Mr. Whittet (Feb. 28) that ampoules should be indelibly printed. This would do away with the use of gummed labels on ampoules, a source of bacterial contamination, and facilitate sterilisation. The indelible printing of ampoules, particularly those containing anæsthetic solutions, has occupied our attention for some time, and, as Mr. Whittet says, machines are available at reasonable cost. Delay in delivery of the necessary apparatus has precluded the earlier adoption of this method but it is hoped that all our ampoules containing anæsthetic solutions will shortly be indelibly printed.

We also agree with Mr. Whittet when he suggests that the pharmacopœial name should be included on the ampoule. It should be borne in mind, however, that before a drug is adopted as official it may have been on the market for many years under a trade name; 'Nupercaine' is an example.

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RESPONSE IN BIOLOGICAL ASSAYS

SIR,—In your review (Feb. 21) of the second edition of Dr. Coward's well-known book, *Biological Standardisation of the Vitamins*, there occurs an obiter dictum which, if true, might seriously undermine our faith in the scientific basis of genetics and one of its most widely practised applications. You write: "The variation between animals, *even those of the same litter of a highly inbred strain*, is very great. . . ." The phrase italicised (by me) exaggerates, if it does not mislead.

Experience of hundreds of biological assays involving the use of pure-line albino rats, inbred by brother-sister mating for about fifty generations, makes it possible to contribute objective data on the matter. The design of these assays and variance analysis of the animals' responses permit valid comparisons of the variation between the individual responses of animals of the same litter (within-litter variance) and between the average responses of animals in different litters (between-litter variance). In almost every instance the latter is significantly greater than the former (at $P = 0.05$), and generally it is very much greater. In a recent assay, for example, in which 48 animals were arranged as 4 dosage groups and 12 litter-mate sets, the respective variances were 0·97 (d.f. 6) and 0·075 (d.f. 20); the P value for the variance ratio is much less than 0·001.

I have called attention to this recalcitrant between-litter variation on many occasions: if we understood its cause and could eliminate it, we could still further increase the accuracy of many biological assays and exploit yet more fully the unmistakable advantages of using pure-line stocks of animals. But the causes of this phenomenon are, as far as I can make out, completely unknown, possibly because there has been little, if any, attempt at their systematic study. The subject would seem eminently suitable for coöperative investigation by geneticist and bio-assayist, nutritionist, or pharmacologist.

Your review, I suggest, has obscured the fact that the need, as you put it, "to plan experiments carefully" (in particular, those carried out for quantitative purposes—that is, "assays") exists primarily because of this persistence of between-litter variance, and not because of the within-litter variance, which can be and has been reduced to very low proportions.

Glaxo Laboratories Ltd., Greenford, Mddx. A. L. BACHARACH.

CARCINOMA OF PROSTATE WITHOUT RECURRENCE

SIR,—It seems desirable that all cases of this kind should be briefly recorded if only to lessen the otherwise gloomy outlook of sufferers. The facts are as follows:

When Mr. X was in his early fifties he began to have symptoms of prostatic trouble, for which he was operated upon in the winter of 1917–18. The prostate was found to be very hard, and owing to considerable adhesions it was somewhat difficult to remove. It contained a growth proved microscopically to be a scirrhous carcinoma, which the surgeon (since deceased) looked upon as of a particularly malignant type. Happily, neither the patient himself nor his immediate family asked any questions, but assumed that it was just an ordinary straightforward removal of the prostate. The patient is now in his 87th year, and except for the usual accompaniments of advancing age—difficulty of hearing and sight—leads an active, healthy life. There has never been the slightest trouble with urination or with anything else since his operation.

F.R.C.P.

PLANTAR WARTS

SIR,—The correspondence on plantar warts has stimulated us to follow up a small series of cases treated at the skin department of the Sheffield Royal Infirmary.

A circular letter was sent to 30 patients who were suffering from plantar warts when they attended the department in the first six months of 1946. The letter requested them to attend for examination or, if this was not possible, to send us details of the treatment they had received and their present condition. The year 1946 was chosen because it was considered that any recurrences would have appeared in the intervening two years. Replies were received from 22 patients.

The treatments employed were:

1. Bathing the area of the wart with 3% formalin for 15 min. daily.
2. X-ray therapy—800r unfiltered at 100 kv., 5 ma. on one occasion only.
3. Curettage with cauterisation of the cavity with solid silver nitrate.

The following is a brief analysis of the replies:

Treatment	No. of cases	Cure	Average age	Failure	Average age
Formalin	12	8	11·6	4	32
X-ray therapy ..	7	6	18·1	1	34
Curettage	2	1	14	1	43
	21	15	14·4	6	34·1

The remaining case was already suffering from a radio-necrotic ulcer—a result of treatment received previously whilst in the Forces. He required plastic surgery.

The rate of failure is high, but most of the patients had only one type of treatment and then ceased to attend. Of the failures, 1 had, however, received treatment with formalin, X-ray therapy, and curettage; and this patient still had a plantar wart on examination two years after his first attendance. A further 3 of the failed cases were attending chiropodists.

It may be noted that all the failures were in adults, and their average age was 34·1 years. The average age of the cured cases was 14·4. It would appear that,

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as in other types of warts, the prognosis and response to treatment is better before puberty.

Our impression is that many simple measures are successful in children and that the formalin method is a safe and efficient routine treatment. In adults, however, formalin frequently fails and then curettage is the treatment of choice. But even with the most careful technique, in a few unfortunate individuals recurrences will continue.

Department for Diseases of the Skin, Royal Infirmary, Sheffield. I. B. SNEDDON THOMAS PARKIN.

SIR,—Mr. McLaughlin's paper (Jan. 31) has drawn severe criticism from Dr. Allchin (Feb. 28). He dislikes the use of the word "irrational" as applied to radiotherapy. As I read Mr. McLaughlin's paper he does not use the word in so general a sense. He is much more precise. He says that radiotherapy *of plantar warts* is irrational. He might have said that a treatment which produces so many disastrous results cannot be held to be anything else than foolish—a well-accepted meaning of the word "irrational." I would go even further and say that for warts in general it is dangerous and should be abandoned.

Dr. Allchin states that any radiotherapist of experience knows that doses of 800r to 1200r will not cure a plantar wart, and he suggests that there is a safe dose of a certain quality of X rays which will do the trick. He does not tell us what that dose is, though again he says that any radiotherapist knows what it is. Yet at a recent symposium on radionecrosis, held at the British Institute of Radiology, attended by many radiotherapists of wide experience, it proved impossible to obtain agreement on the correct dosage. It varied from 700r to 3600r. It was, moreover, obvious that some of the speakers were blissfully unaware that their patients had sustained radionecrosis, and were consequently satisfied that their particular dosage was safe and adequate. Patients with radionecrosis rarely return to the radiotherapist responsible. They go elsewhere.

The fact is that many palmar and plantar warts are amenable to almost any treatment including elastic adhesive bandages and charming. But there are a certain number resistant to any form of treatment, including X rays. As a last resort they are treated by the radiotherapist, and far too many of them end up with radionecrosis in the hands of the plastic surgeon.

I should urge that, until a generally agreed safe dosage of X rays is established for this troublesome condition, it should be left to the scrapers, the fulgurators, and the cauterisors, or to Mr. McLaughlin's more "rational" treatment. These may not cure the wart but at least they will not cripple the patient.

ARCHIBALD MCINDOE.

Plastic Surgery and Jaw Injuries Centre, Queen Victoria Hospital, East Grinstead.

SIR,—Dr. Allchin's letter demands an answer, though his meaning in parts is so obscure as to render comment difficult. I gather that he favours radiotherapy for certain plantar warts (or perhaps all); but while he deplores doses as small as 1200r, "given under the usual conditions," he does not divulge what dose he does in fact find both effective and safe. I assume, of course, that none of his patients with plantar warts suffer X-ray burns, so it would be of value to know the secret of his method. Nevertheless, I beg leave to brave Dr. Allchin's ridicule and repeat my simple belief that "many plantar warts are insensitive to *safe* doses of X rays."

Those radiotherapists who keep an open mind may still prefer to follow so wise a guide as Prof. B. W. Windeyer who writes [1]: "if there is evidence that a technique . . . has caused or is likely to cause necrosis, I would agree that other methods than radiotherapy should be used for the treatment of warts." The steady stream of such cases of radionecrosis, seen at this centre, is indeed tragic evidence; yet most of these patients have, with unusual delicacy, refrained from returning to disillusion their radiotherapist.

C. R. MCLAUGHLIN.

Plastic Surgery and Jaw Injuries Centre, Queen Victoria Hospital, East Grinstead.

1. *Brit. J. Radiol.* 1947, **20**, 278.

SIR,—In the last 25 years I must have treated several hundred cases of plantar and other warts, in China and England, by a few applications of pure nitric acid, with complete satisfaction and, as far as I know, no mishaps. In view of this complete absence of any apparent ill effects one can hardly feel that there is really any danger of provoking malignancy, especially in young people. The application is almost painless, and any smarting passes off in a few minutes.

The trouble, discomfort, dangers, and expense of operation, radiation, or other treatment must surely be much greater than with nitric acid.

St. Leonards-on-Sea. T. S. GOODWIN.

MEDIAN-NERVE COMPRESSION IN THE CARPAL TUNNEL

SIR,—In an article published last year Brain, Wright, and Wilkinson [1] inquired as to the explanation of the loss of flexion and extension in the thumb and index and middle fingers in cases of spontaneous compression of the median nerve in the carpal tunnel.

They state that one case showed loss of extension of the index and middle fingers; another, loss of extension of the thumb, which recovered simultaneously with the other thenar muscles; and a third, loss of flexion of the thumb.

Cannot the loss in the first instance be explained by paralysis of the two lateral lumbrical muscles? In the second instance, the loss of extension of the thumb may well have been due to paralysis of flexor pollicis brevis—a synergist to extensor pollicis longus. Full extension of the thumb is not possible unless the metacarpophalangeal joint is held in slight flexion by the flexor pollicis brevis. As regards the loss of flexion of the thumb in the third case, I have no explanation unless it was mechanical interference with the tendon where it lies close to the carpal tunnel; but presumably this possibility was eliminated.

The action of the flexor pollicis longus is disputed, and the nerve supply to both the deep and superficial head varies. In ulnar palsy Froment's sign shows us that there is a flexing action of the metacarpophalangeal joint, and this is generally held to be the function of the deep head. What, then, is the function of the superficial head? Is it that it has the same action or does it, like a lumbrical muscle, extend the terminal phalanx? I believe that it is responsible for extension of the terminal phalanx beyond the straight line.

London, W.1. P. H. NEWMAN.

SUFFOCATION BY MILK FEEDS

SIR,—We agree with the view expressed by Professor Polson and Dr. Price in their letter on Feb. 28 that there should be a concerted study of necropsy records in cases of sudden death of nurslings. Such deaths *may* sometimes be due to suffocation by food, yet the same signs at necropsy, with the added help of bacteriology and histology, can fit many names for the cause of death. Careful parents, whose nurslings die suddenly and without warning, can be hurt unnecessarily by a false suggestion of carelessness.

Sudden death in the first nine months of life is so common that we feel the event should be studied more closely by the expert pædiatrician, as also by the pathologist. We lack the confidence implied by Professor Polson and Dr. Price that we can prove the cause of death to be suffocation by food. We note the lack of good histories of the diet and earlier health of this type of case. At any age necropsy may lead to a wrong conclusion if done without a good history.

Including those possibly due to suffocation by food, 45 cases of sudden death of nurslings, examined by us for the coroner between 1937 and 1946, were recently reviewed in detail. This is no place for stating the full details, nor for referring to previous publications; but we wish to mention some points which may not have been noted by others and which may be significant.

1. Except for cardiovascular disease of adults, sudden deaths of nurslings form the largest group of cases within work done by us for the coroner.

1. Brain, W. R., Wright, A. D., Wilkinson, M. *Lancet*, 1947, i, 277.

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2. There is a clear suggestion of a seasonal incidence; considerably more cases occur from December to May than June to November.

3. The age containing most cases is 3–4 months; these are the months when the weight of the thymus gland seems greatest in relation to the weight of the body.

4. About a third of the cases have soft parietal and/or occipital bones to a varying extent, though lacking other and obvious signs of rickets, as is of course to be expected at this age.

5. The evidence of suffocation by food may fall far short of proof; yet other terms such as "convulsions" or "laryngeal spasm" have no more justification. Agonal regurgitation of food to trachea and bronchi is common at any age in natural death; in such circumstances can it reach the lungs? What are the criteria after death of suffocation by food?

6. Many, perhaps most, cases of sudden death of nurslings are more honestly classified as due to an unknown cause.

F. B. SMITH
Pathologist.
R. T. COOKE
Assistant Pathologist.
Department of Pathology, Royal Infirmary, Preston.

SIR,—Even for the initiated it is by no means simple to prepare a smooth mixture that is free from lumps; and it is to be expected that careless or untrained mothers will not do so properly.

In many parts of the world, particularly Canada and the U.S.A., unsweetened evaporated milk is the principal food used in the artificial feeding of infants, and it is surprising that this form of milk is not more generally prescribed in this country, since it has all the merits of milk powder without its disadvantages. Being already in liquid form, evaporated milk mixes instantly with water, and the butterfat does not separate because it has been homogenised. It can be much more accurately measured than powder milk, and it is sterile.

London, E.C.4. GENERAL MILK PRODUCTS LTD.

THE PATIENTS' HOSPITAL

SIR,—It is distressing to read the attempt by Dr. Priest in his letter last week to pour cold water on your efforts to promote reform in hospitals.

In spite of what Dr. Priest says, patients are often wakened earlier than is necessary. At the London teaching hospital where I was nursing before and during the war, we were not allowed to waken the ward as a whole till 6.30 A.M. On heavy surgical wards it was certainly necessary to wake individual patients earlier than this to give them their treatments, but by using shaded lights and reasonable care we succeeded in not disturbing the whole ward. In spite of this relatively late wakening of patients, the wards were open at 10 A.M.

Most hospitals allow visitors on two afternoons a week. What objection can there be to allowing visitors on the other days at 7.30 P.M. for half an hour or an hour? This arrangement exists at the Westminster Hospital, and if there, why not everywhere? The ward work will not have been completed by 7.30, but such things as giving out medicines and tidying lockers can be done in the presence of visitors. Treatments which necessitate privacy can be done behind curtains or screens; this will hold up that particular patient's visitors for only a short time and need not interfere with other patients' visitors.

I agree with Mr. Parry that a great deal more can be done for patients by the use of a little imagination, and that much of what irks them now is determined by custom and not necessity. Incidentally, cannot such names as Cancer Hospital, Hospital for Consumption, and Home for the Dying, be abolished?

London, N.W.3. B. H. OSBORNE.

SIR,—Many hospitals have adopted my suggested reforms with no detriment to or dissatisfaction of either the doctors or nurses concerned. If so many hospitals can do this, why not all? Nothing else is required but the good will and determination of all those responsible for the management of the hospital. The committee, the medical staff, and the matron, working together, are omnipotent, and can soon alter things so that the best is done to make the hospital a byword for competence and happiness. Dr. Priest's defeatist attitude would keep all second-class hospitals in that category. I want to raise their status.

If Dr. Priest will visit one of the hospitals where these reforms are regarded as normal procedure, he will be surprised at the smoothness and efficacy with which they work and also at the much more happy and contented attitude of the patients. He may then possibly lessen his opposition to these much-needed changes.

Hove. L. A. PARRY.

A FAMILY WELFARE SERVICE

SIR,—I was much interested in your annotation (Feb. 28) on the P.E.P. broadsheet, *Family and Nation*.

The Family Planning Association is in complete agreement with the views of P.E.P. that advice on sound family planning should be part of the new Health Service. Of the 404 maternity and child-welfare authorities in England and Wales, about 140 have still not taken any steps whatever even to provide advice within the terms of the Ministry of Health memoranda; of the remainder, by no means all have taken effective action. In the year ended March 1, 1948, no fewer than 30,000 *new* patients obtained advice through the 55 branches of this association about contraception, subfertility, marital guidance, and minor gynæcology.

Any of your readers who are interested in this question are invited to write to the secretary of the association at 69, Eccleston Square, London, S.W.1.

S. C. S. ROBINSON
General Secretary.
London, S.W.1.

THE CENTRAL COUNCIL

SIR,—The National Health Service Bill that went through Parliament contained the highly important proviso that there should be a Central Health Services Council to stand at the Minister's right hand. This council, if it is ever created, is to be allowed to make its own annual report and thus will have some right of appeal to public opinion against any trends on the part of the Minister and his officials which might need to be corrected. It is true that the Minister may refrain from laying the report before Parliament, but it is hardly likely that he would do so.

The hospital provisions of the Act have gone forward; the regional boards have been appointed and are preparing to take over on July 5; the general practitioners' service is due to be inaugurated on July 5; and yet the central body remains in abeyance.

Writing from the standpoint of a chairman of a voluntary hospital, I venture to suggest that the leaders of the profession should make the establishment of this council a cardinal plank in their policy. It is intelligible that the Minister is reluctant to proceed to constitute the council, since he no doubt fears that it would but reflect the views of the Negotiating Committee, and so make matters still more difficult. But it may be that Mr. Bevan is mistaken in this. There would be a vital difference. On the council, although the professional interests would command a substantial majority, there would be a restraining influence, represented by some of those nominated by the non-professional interests, whereas on the Negotiating Committee this moderating influence goes by default. One of the things which is most needed is some mechanism which will eliminate the more extreme sentiments that are apt to cloud the issue. I am not proposing that the discussions between the Minister and the Negotiating Committee should be transferred to the C.H.S.C., for they are certainly matters which must somehow or other be settled between the profession and the Minister. But the existence of the council might offer a way of escape from the present dilemma if it proved possible for the Negotiating Committee and the Minister to agree that some of the issues now in dispute might properly be referred to it and that a decision might be postponed until it was in a position to report on them. A certain lapse of time would be no disadvantage. The Minister is not bound to take the advice of the advisory body—his hands remain free: but were he permanently to pursue policies contrary to its considered advice we should know where we stood in a way that we do not today.

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From the point of view of the British Medical Association such a course has much to commend it. The temptation to allow the present dispute to assume a political complexion would be diminished. The greater the drift in this direction, the stronger is Mr. Bevan's contention that Parliament has spoken and settled the matter. The necessity for the professional representatives to state their case so as to carry the Central Health Services Council would help to eliminate what seems to the outsider to be an overstatement of the case. From the Minister's angle the procedure offers a legitimate opportunity, to sidestep slightly the present impasse and to use new machinery. It offers him besides an opportunity to set the coping-stone squarely in place upon the legislation he put through Parliament.

It is all wrong that there should be, or even seem to be, a divergence of interest between the Minister and the profession. In the long run the profession should be able to look to its Minister to help it to fight its battles, to press the claims of health services upon the Exchequer and other Government departments. The Central Health Services Council is a necessary part of the machinery enabling him to do so.

London. A. MURRAY.

Parliament

QUESTION TIME

Arbitration

Mr. R. DE LA BÈRE asked the Prime Minister if, in view of the necessity of obtaining the coöperation of the maximum number of the medical profession before July 5 he would consider appointing an independent arbitrator for the purpose of finding a solution to the present impasse.—Mr. C. R. ATTLEE replied: No sir. Matters which have already been decided by Parliament would not be a proper subject for arbitration. —Mr. DE LA BÈRE: Is the Prime Minister fully aware of the very grave position which must arise in July because he has refused to meet the views of the vast majority of the doctors? Is he further aware that the people of this country want to know why the Government have allowed this position to come to pass?—Mr. ATTLEE: That does not give any justification for the hon. member's proposal.—Mr. DE. LA BÈRE: It gives every justification.

Air Commodore A. V. HARVEY: Do the Government intend to charge the public for a service if they are not in a position to supply it? (Cries of "Answer.")—Mr. WILSON HARRIS: Would the Prime Minister be prepared to lend a hand himself in future negotiations, if he should think that that would be likely to help matters?—Mr. ATTLEE: I am prepared to consider any suggestion put to me.

Squadron-Leader E. L. FLEMING: Are we to understand that no approach has been made up to date by either the B.M.A. or the Minister of Health on this matter? Mr. ATTLEE: To whom?—Squadron-Leader FLEMING: Each other. No further reply was given.

Treasury Grants to Hospitals

Mr. SOMERVILLE HASTINGS asked the Minister of Health whether he was aware that certain voluntary hospitals now receiving Treasury grants made the receipt of an honorarium by members of their honorary staffs dependent on resignation from their medical advisory committees; and if, in these cases, he would consider withdrawing the grant.—Mr. ANEURIN BEVAN replied: Although I deprecate any such action, Exchequer help is given before the appointed day to keep the hospitals going and would not in my view justify interference with their domestic affairs.

International Children's Emergency Fund

In answer to a question Mr. ERNEST BEVIN announced that the Government had decided to make a contribution of £100,000 to this fund, but that the exact fashion in which it will be allocated was not yet determined.

Exchange Control Medical Advisory Fees

Major E. A. H. LEGGE-BOURKE asked the Secretary to the Treasury how much had been collected in fees from applicants by the Exchange Control Medical Advisory Committee since its establishment; what proportion represented fees taken from those subsequently refused foreign exchange for medical treatment abroad; and what was the composition of the committee.—Mr. GLENVIL HALL replied: £1659, including £378 from applicants who were subsequently refused foreign exchange for medical treatment abroad. The members of the committee are all distinguished medical specialists who have received no payment beyond the fees mentioned above. I would add that it has been decided that no fees will be payable by applicants as from March 1, 1948. In future all applications to the committee should be made through a doctor and not by the patient himself.

Special Rations for Invalids

Mr. H. W. BUTCHER asked the Minister of Food why he had refused to grant additional rations to a boy resident in Spalding, whose own medical adviser had given a certificate that the boy had been intermittently suffering from asthma for 7 years; had been in and out of hospital several times; had stated that he would benefit from extra rations as he was under weight; and whether, before refusing such rations, he arranged to have the boy medically examined by the Ministry's medical advisers.—Dr. EDITH SUMMERSKILL replied: Our medical advisers never undertake to examine applicants for special rations, but always accept the diagnosis of the patient's own medical adviser. Their unwelcome task is to advise on the relative needs of different groups of invalids bearing in mind the limited amounts of rationed food available. The need of uncomplicated cases of asthma for extra rations is not such as to justify a claim on this limited supply. If the case mentioned is in some way complicated, I will gladly ask our medical advisers to consider any fresh information.

Mr. BUTCHER: Is the hon. lady aware that in the doctor's certificate dated Nov. 9 the local doctor categorically stated that the lad would benefit from extra rations? Is it the practice of her department to disregard the advice of the local medical practitioner who has seen the patient in favour of the advice of people in London, who, however distinguished, have not even been near the boy?—Dr. SUMMERSKILL: Asthma is a fairly common complaint and if we gave extra rations in this case we would open the door to a large number of people who would feel that they should be treated in the same way. I have examined all the documents relating to this case and I have invited the hon. member to give me a further certificate elaborating what the doctor had already said, in order that I should know of any special circumstances which would enable me to permit these rations to be given. The only letter which I have had is one telling me that the child had a dry skin.

Mr. J. S. C. REID: Is the hon. lady's reason for refusing these allowances that she thinks that the doctors do not know their job, or that she does not trust them? There seems to be no other reason.—Dr. SUMMERSKILL: I think that that is a reflection on the distinguished men who advise us in these matters, all of whom are physicians or surgeons. I must repeat that we give extra rations in order to alleviate certain symptoms. I do not think that any doctor in this country would say that these extra rations which are being called for would necessarily alleviate the symptoms of asthma.

Priority Milk Permits for Dyspeptic Patients

Mr. EDWARD DAVIES asked the Minister of Food if he would make arrangements for doctors to issue priority milk permits, valid for more than one month, to old-age pensioners with feeble digestions and whose need was likely to be prolonged. —Dr. EDITH SUMMERSKILL replied: The medical advisers of my department consider it essential to restrict the validity of medical certificates for dyspepsia to one month, as this is not necessarily a chronic complaint, and a short period of validity, therefore, conserves supplies.

Disability Pensions for Diabetes Mellitus

Mr. GRANVILLE SHARP asked the Minister of Pensions what was the approximate number of claims for disability pensions made by Servicemen of the 1939–45 war on account of diabetes mellitus; what proportion of these he had rejected; what proof there was that men, classified as A1, who had fought through the hardest campaigns but were later discharged as medically unfit with diabetes mellitus, must trace their condition to an inborn weakness of the pancreas; and whether he would review the position and reconsider the claims he had rejected in the past.—Mr. GEORGE BUCHANAN replied: The answer to the first part of the question is 3600,

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of which about 3000 have been rejected. As regards the second part, ex-Servicemen are not required to trace the cause of their disablement. On the contrary, the onus of proving that their condition is not due to war service rests on me. The recent dismissal by the High Court of some appeals in cases of diabetes shows that in those cases the learned judge's view was that this onus had been discharged. In the circumstances it is difficult for me, in face of the High Court decisions, to review all past cases, but I am of course always willing to examine any particular case in which fresh evidence becomes available and would also be prepared to look at the general question in the light of any modification of the existing medical view in this type of case.

Mr. SHARP: In view of the fact that many of these men were considered to be fit to fight through the hardest campaigns, will the right hon. gentleman agree that, having lost their health in war service, they should be considered to be fit for pensions?—Mr. BUCHANAN: The hon. gentleman raises the general issue that, if a man was A1, he should get a pension. I do not mind that becoming the view of the Government, but the House of Commons must make a decision of that kind. Under the Royal Warrant I have to deal with medical evidence, and the medical evidence in this case, even with the best will in the world, is against taking them in, and the High Court has upheld that decision. In the meantime, I have to administer the Act, and if my hon. friend or any other person can bring evidence to show that the doctors are not right in this matter, nobody will be better pleased than I am.

Public Health

Smells

IN both Britain and the United States the perception of human odours has recently been taken as the principal criterion of the efficiency of ventilation. One by one the more objective standards, such as oxygen and carbon dioxide, have been discarded; and now the nose is arbiter even in the Egerton report[1]:

> "Several English research workers used body odour concentration as the index of the purity of the air. Recently, American research workers have studied this aspect in more detail and formed the opinion that body odour is a suitable criterion for ventilation, and that when it is perceptible headaches may result, and people subjected to the odours may lose their appetites. The amount of fresh air was, therefore, estimated on the basis of that necessary to keep the space occupied free from noticeable odours, and this work has been used in the present report to determine the requirements for ventilation" (p. 20).

We ought not to condemn the sense of smell without a fair trial. A similar test is used in certain industries, apparently with good results. Even a great firm of chocolate-makers relies on the olfactory sense of a handful of young women in deciding whether the eggs that go (or used to go) into its products are good or bad. May not three sniffs of the trained nostril be as effective as the palate of the wine-taster, who after all depends largely on bouquet for his assessment?

The rancid vapours of human bodies (as the Rev. Stephen Hales called them) have been recognised since the beginning of history, and B.O., as it is now called, is as villainous a stage joke today as in the time of Aristophanes. Our satire, it is true, omits explicit reference to the goat under the armpits[2] and other unpleasant emanations, but we still take delight in Dr. Johnson's famous rejoinder, and his learned distinction between smell and stink. We are no doubt more sensitive to body odours than we used to be in the good old days, when we enjoyed everything well seasoned, but this does not in itself establish a criterion. In other words, there is need for research into the causes of the phenomenon,[1] the means to be adopted for its abatement, and the value of the test as a criterion of the atmospheric purity of a room.

1. Ministry of Works Post-war Building Studies, no. 19, 1945.
2. Catullus, lxix.

CAUSES

Certain points may be regarded as established. The accumulation of odours in a room occupied by human beings is in part caused by the discharge of organic material from the bodies of the occupants. It occurs when no clothing is worn and when the bodies are thoroughly clean. Further study is required to determine the nature of this material. The concentration of smell is substantially increased when the bodies have not been washed for some time and when the clothing has not been changed. There is no evidence to indicate whether the heavy type of clothing commonly worn in Britain gives rise to a stronger smell than light summer clothes. Yaglou[3] found no difference between the sexes, but recorded that children had a more pronounced body odour than adults.

There is a significant association between social class and body smell, and many of the stinks which we connect with overcrowding and slum conditions generally come from human sources, including excreta, and from odoriferous occupations.

A second point to observe is that some persons tend to stink more than others. In the overwhelming majority of instances this can be remedied by meticulous cleansing of person and clothing, or by medical or dental treatment—and in refractory cases by some of the widely advertised deodorants. It may be true in a spiritual sense that "the dirty sweaters are nearer the angels for cleanliness than my Lord and Lady Sybarite out of a bath, in chemical scents"[4]; but this is poor comfort when one has to occupy the same room.

The Egerton report, after reviewing the minimum standard of ventilation required for health, adopts a figure of 600 c. ft. per hour per person which "should be sufficient to prevent an undue concentration of objectionable odours, and is suitable for persons of average cleanliness." "Average cleanliness" is not defined, nor is the type of clothing worn in a ventilation test. In the American studies Yaglou is more precise in his reference to light summer clothing; but he is rather vague in his account of the bathing habits of his subjects and of the time when they last changed their clothes. Moreover, no distinction is made in any of the records between outer clothing and underclothing. However that may be, it is of melancholy interest to record that American workers, using the same criterion as British, find that 400 c. ft. per hour per person is sufficient to prevent the accumulation of body odours. One might be tempted to draw an inference.

ABATEMENT

The means to be adopted for the abatement of body odours obviously depends on the accurate analysis of their nature. It has been reported, for example, that body smells tend to disappear in a comparatively short time, even in the absence of ventilation, while the stink of tobacco increases with time and becomes more unpleasant. We have no very clear knowledge of the relation between body odour and temperature or humidity; or of the relative contribution of person and clothing. It may be that a simple remedy can be found, perhaps applicable to clothing or to the air of a room. At any rate here is a subject for research. We have no right to assume that ventilation is the only, or even the most desirable remedy. The fact that recirculated air is as effective as fresh air in removing body odours is of interest, but before giving official approval to any new form of air-heating we must be sure that the system will not intensify the problem of smells. Air-ducts may possibly become the habitat of certain lowly creatures notorious for their unpleasant stink, and the

3. Yaglou, C. P., Riley, E. C., Coggins, D. I. *Heating, Piping, and Air-conditioning*, 1936, 8, 65.
4. Meredith, G. The Amazing Marriage.

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last state of the air-heated room may be worse than the first. We need to know more, chemically and physiologically, about smells.

ODOUR AS A CRITERION

Enough has been said to cast a little doubt on the value of body odours as the criterion of the atmospheric purity of a room. It is a rare thing to detect body odours in a modern American house, despite the fact that ventilation is usually less than in our homes and warmth considerably greater. Among the possible reasons for this difference are:

1. American homes are warmer, and so people wear lighter clothes.
2. Americans of both sexes change their clothes more frequently than we do, and their clothes are more frequently washed.
3. They have more frequent baths.
4. As a result of central heating they do not crowd so much into one room.
5. They do not accumulate large stocks of old clothing.

Notifications of Infectious Diseases

ENGLAND AND WALES

Disease	Week ended Feb. 7	14	21	28
Cerebrospinal fever	56	54	36	31
Diphtheria	223	211	180	173
Dysentery	160	164	191	145
Encephalitis lethargica	..	1	1	..
Measles	5596	6179	7209	7312
Ophthalmia neonatorum	63	45	79	47
Paratyphoid fever	6	2	3	3
Pneumonia, primary or influenzal	1012	871	788	732
Polioencephalitis	6	4	3	1
Poliomyelitis	25	28	27	24
Puerperal pyrexia	118	104	86	95
Scarlet fever	1943	1925	1828	1710
Smallpox	..	..	..	..
Typhoid fever	12	7	1	..
Whooping-cough	2572	2576	2552	2631

For Travellers to and from the United Kingdom

From April 1 all incoming aircraft from infected places abroad are to be met by medical officers. This is laid down in the Public Health (Aircraft) Regulations, 1948, according to which the commanders of aircraft will on arrival report the state of health on board, and passengers will give the names of places in which they have been during the previous 14 days. Passengers will be given (as at present) a card setting out the simple precautions they should observe if they fall ill within 21 days after arrival. Aircraft plying between England and Wales, Scotland, Northern Ireland, and the Channel Islands, and Isle of Man will not be subject to the regulations. A memorandum (5c) on health control at airports has been issued by the Ministry of Health.

Immunisation of outgoing travellers.—A notice for the guidance of British subjects travelling abroad has been issued jointly by the health departments of England, Scotland, and Northern Ireland. The following general information is given:

1. All travellers abroad are advised to be effectively inoculated against typhoid and paratyphoid fevers.
2. The health authorities of certain countries (e.g., Australia) and some countries in the tropics and subtropics may require travellers to produce evidence of recent vaccination against smallpox (i.e., evidence that they have been vaccinated not more than three years and not less than fourteen days previously).
3. Travellers to parts of the Far East where cholera is endemic are advised to be inoculated against this disease.
4. Inoculation against typhus is advised for travellers to countries (e.g., in South-east Europe and North Africa) in which that disease exists.
5. Travellers who have been in or who pass through those parts of Africa or South America where yellow fever is considered to be endemic are reminded that, when they enter other countries in which yellow fever does not actually exist but where the conditions favour its development (e.g., India), they may be detained at frontier quarantine stations if they do not possess a valid certificate of inoculation against yellow fever (i.e., a certificate issued not less than ten days and not more than four years previously). Special arrangements have been made for yellow-fever inoculations to be given free of charge at certain centres in the United Kingdom.

When a traveller has been vaccinated against smallpox or inoculated against cholera, typhus, or yellow fever, he should obtain, and carry with him, a certificate to that effect on the international form. A certificate of inoculation against yellow fever will be issued on this form by the doctor carrying out the inoculation: for the other diseases, the necessary form (for completion by the doctor) can be obtained by the traveller from the company with which he has arranged his transport. For details travellers should apply to the United Kingdom representative of the country to which they propose to go.

Obituary

JOSEPH JOHN CLARKE

L.S.A., L.R.C.P.I., D.P.H.

Dr. J. J. Clarke, a justice of the peace for Essex and a former medical officer of health for Walthamstow, died at Hove on Feb. 24 at the age of 86.

He was educated at Queen's College, Cork, and the Middlesex Hospital, taking the L.S.A. in 1889 and the Irish Conjoint qualification five years later. With his brother, S. A. Clarke, he settled in private practice in Walthamstow, and in 1898 he was appointed part-time medical officer of health to the local urban district council. In the same year he took the D.P.H. with honours, and in 1906 he became whole-time medical officer of health.

During the 24 years in which he held this post Dr. Clarke built up the health services of Walthamstow, and he was largely responsible for the erection of a fine infectious diseases hospital which included the first cubicle block ever erected in this country. The idea followed from a visit to Paris, and the plan of the block was for many years a feature in public-health textbooks. It is still in use, and it has been in every way satisfactory for more than 40 years. Dr. Clarke also sponsored the erection of an up-to-date welfare centre in Markhouse Road and did much for the provision of specialist facilities in connexion with school health services.

He will be remembered by his colleagues and friends for his charming Irish personality and his readiness to help in all cases of misfortune. His later retirement was unfortunately marred by ill health. A. T. W. P.

ALBERT ALEXANDER ATKINSON

M.B. EDIN.

Dr. A. A. Atkinson, director of medical services, Limb-Fitting Service Headquarters, Ministry of Pensions, died in his 61st year on March 2, after a short illness at Queen Mary's Hospital, Roehampton.

After qualifying at Edinburgh University in 1911 he became a partner in a practice in the Leeds district. On the outbreak of the 1914–18 war he joined the R.A.M.C. and served in the Middle East. He was severely wounded on the Salonika front and he underwent a high amputation of the left leg. In 1918 he was fitted with his first artificial leg at Roehampton, but his military service was not ended. He transferred as a medical officer with the Royal Air Force and on demobilisation with the rank of major he became a limb surgeon on the staff of Queen Mary's Hospital, and later medical superintendent of the hospital. In 1925 he was transferred to the Ministry of Pensions in Westminster as medical head of the limb and appliances branch.

As a result of his disability he was often in pain, but he refused to allow it to interfere with the work which he had at heart. He will be remembered with affection and respect by all who worked with him for the welfare of the disabled.

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Notes and News

THULE ESKIMOES

In Northern Greenland the Eskimoes still get their food by such perilous means as walrus-hunting; they still risk death from a change in the weather whenever they undertake a journey; and trivial disorders may endanger their lives because even simple remedies are lacking. This task of wrenching a living from nature at her least compliant ought to have turned out a race of taciturn giants: instead, it has produced the small and merry Eskimoes, who love a party, dress richly and gaily, welcome a guest with the best they have—even if they go short next day—and undertake a sledge trip of 2000 miles, into Canada and back, by way of a holiday.

In a short book,[1] illustrated with his own splendid photographs, Dr. Aage Gilberg tells of a year spent in Thule as the State doctor of the Danish government—a year in the service of some of the most likeable and kindly people in the world. His account of their living conditions and their health is of particular interest to doctors. Life in crowded turf huts during the six dark months should mean the destruction of a people already heavily infected with tuberculosis; but their lesions heal so rapidly in spring and summer that even this enemy cannot wipe them out—or has not done, so far. Their cleanly habits help: once an Eskimo has been taught that his cups and plates must be boiled after use he is scrupulous in seeing that it is done. When he coughs he covers his mouth with his left hand, lest—if he used his right—he might transfer bacilli to the palm of the next friend whose hand he shook. All summer the turf hut is left open to air and sun, while the family lives in a tent made of skins and enjoys twenty-four hours a day of clean air and sunlight. And there really is sunlight: Greenland gets more sunny days in the year than Denmark.

Living so largely on fatty sea-creatures, the Eskimoes are not short of vitamin D. Dr. Gilberg was able to show that they do not lack vitamin C either: the skin of narwhal, and the liver and kidneys of walrus and seal, are well stocked with it, and these the Eskimo esteems a dainty dish and eats raw. Dr. Gilberg and his wife came to enjoy them too, and he speaks particularly warmly of whale skin, which tastes, he says, like fresh nuts in September.

BACK STREET SURGERY [2]

In a new pamphlet three writers, all women, put before the public some of the cogent reasons for a reform of the law on abortion. They use a simple, popular style, but support their case by reference to statistics such as those provided by the British Medical Association committee of 1938. This report seems to have been shelved by the war, and the medical profession is described as reluctant to make the first move towards asking for a change in the law. The authors believe that the only way to abolish the present dangers to life and health from illegal abortions is to allow doctors to perform this operation for medical or other reasons.

THE NURSE AND THE PATIENT'S FOOD

In the old days, when a nurse left the bedside it was to go into the kitchen to make something nice for the patient to eat. Nowadays most newly qualified nurses are very little better at cooking than the average girl from a public school. In a memorandum to the Minister of Health the committee on hospital diet of King Edward's Hospital Fund for London points out that, though the training course outlined by the Working Party provides for a brief visit to the dietetic department, such a visit could be only introductory, and moreover the dietetic department deals with only one specialised branch of a wide subject. "It is even more important that the student nurse should learn and be trained in the general principles of feeding in health and sickness. The early age at which candidates are now accepted for training, and the lack of home training in the preparation of meals, makes such teaching and experience all the more essential." The committee recommends that "teaching in the general principles of nutrition in health and sickness, practical training in the serving of meals to patients, and experience in the special dietetic department, should all be given a more important place in the nursing curriculum than they occupy at present." In our own columns not long ago Miss Margaret Broatch,[1] of the King's Fund, commented unfavourably on American practice by which nurses become remote from all concern with food, and orderlies attached to the staff of the dietitian are responsible for taking the trays to patients.

1. Eskimo Doctor. London: George Allen & Unwin. Pp. 150. 15s.
2. M. Ryan, M. Edgecombe, and J. Chance. Published by the Abortion Law Reform Association, 53, Gloucester Terrace, London, W.2. 1947. Pp. 19. 1s.

NOAH MORRIS MEMORIAL

A committee representing various student interests has been formed in Glasgow for the purpose of erecting a memorial to the late Prof. Noah Morris, who held the chair of materia medica in the university until his death last June. Donations may be sent to the clerk of council, Glasgow University Students' Representative Council, Pearce Lodge, The University, Glasgow, W.2, cheques being made payable to the Students' Representative Council.

COÖRDINATION OF AMERICAN HOSPITALS

In the United States, as elsewhere, country-dwellers are less well served by hospitals than are townspeople; but the Hospital Survey and Construction Act offers hope of remedy, and up to $1125 million is to be spent in the next four years on hospital construction with the purpose of establishing a coördinated system throughout the country. Thus for the moment interest has turned from the design of large city hospitals to that of the smaller institutions for townships and villages; and the retiring surgeon-general, Dr. Thomas Parran, has lately set his seal to type patterns for institutions with up to 200 beds.[2] These designs are for community clinics, community hospitals and "health centres," and district hospitals, all of which are to subserve a "base hospital" corresponding to the teaching hospital in each region of the United Kingdom.

TECHNICAL INTELLIGENCE SERVICE

No research-worker or administrator in any field of science can hope to keep abreast of all developments; for towards its fringe each field merges into the next. Writing on the work of the Ministry of Health intelligence section, Dr. W. P. Kennedy [3] suggests that other departments and organisations should set up similar sections, headed perhaps by "research workers . . . who yet lack that breath of the divine afflatus to give their work originality." Dr. Kennedy sets out in detail his proposals for integrating technical information by means of a library, together with card-indexes, bibliographies, and a press-cutting service.

AMERICAN TRENDS IN ALCOHOLISM

Surmises about the increase of drinking in the United States have been the subject, it seems, of magazine and newspaper articles. These have been founded mainly on impressions which a study [4] by E. M. Jellinek, Sc.D., shows to be largely unreliable. He points out that though the consumption of alcohol has increased since the last century, so has the number of "population of drinking age"—that is, over the age of 15. Though the per-capita consumption of alcoholic beverages rose during the recent war, it still remained below the level of the years before Prohibition; and moreover, though the number taking alcohol was greater, individual consumption hardly increased at all. Nor has there been any spread of "hard drinking"; on the contrary, since 1850 the per-capita consumption of distilled spirits has fallen by more than half, whereas the consumption of beer per head has gone up by 862%.

The estimated number of chronic alcoholics per 100,000 adult population was 1248 in 1910; between 1915 and 1920 the number dropped sharply and remained relatively low (671–682) during the Prohibition years. The rate went up between 1930 and 1945 to 857, but this is still 31% below the rate in 1910. The rate of chronic alcoholism in women has by no means shown the sharp rise which some have claimed for it. In 1910 the rate was 384 per 100,000 adult population, as compared with 242 in 1945; and though, during Prohibi-

1. *Lancet*, 1947, ii, 884.
2. *Hospitals*, 1948, 22, 49.
3. *Publ. Admin.* Spring, 1948.
4. Recent Trends in Alcoholism and Alcohol Consumption. New Haven: Hillhouse Press. 1947. Distributed by the *Quarterly Journal of Studies on Alcohol*. Box 2162 Yale Station, New Haven, Conn., U.S.A. Pp. 42. 50 c.

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tion, the rate was even lower, the increase between the repeal and 1945 was only 12·6% in women as against 43·6% in men. The entire increase in chronic alcoholism since 1930 has been in the towns: in country districts the rate has fallen slightly. There is no evidence that death from chronic alcoholism is occurring at an earlier age, or that the age at the time of admission to hospital for alcoholic psychosis is falling.

It is interesting that the chronic-alcoholism rates in different States vary with the strength of what Dr. Jellinek calls "dry sentiment." He takes the percentage vote against the repeal of the Eighteenth Amendment as an index of dry sentiment, and shows that in States with a majority against repeal the chronic-alcoholism rate averaged 378 per 100,000 adult population; in States with 35–49% of votes against repeal the average rate was 435; in States with 25–35% of votes against repeal the average rate reached 623; and in States with less than 25% against repeal the rate averaged 832. It seems that chronic alcoholism, like many other forms of social behaviour, is largely determined by the custom of the country.

RENAISSANCE DENTIST

Mrs. Lilian Lindsay's translation of the 1746 edition of Pierre Fauchard's historic book, *The Surgeon Dentist*,[1] is something more than an accurate presentation of the text; she helps the reader to see the man himself. Fauchard belonged to that fertile period at the end of the Renaissance which produced so many remarkable men—including Jean Fernel in France and Newton in this country. Finding his inspiration in the Hippocratic school he did not confine himself to the study of the teeth, but, true to his art, gave a comprehensive account of diseases of the mouth generally. His records of observation of individual cases are models. The various formulæ for opiates for the teeth, mouth-washes, and other preparations may seem to us over-elaborate, savouring of polypharmacy, but this was customary in the time in which he lived. Interest is added by illustrations showing the various appliances and instruments used by Fauchard in his practice.

The work is the record of a great man, as well as a master in the art of dentistry—one who sought by public service to benefit humanity and relieve the sufferings of his fellows. Its translation by a fellow member of the dental profession has been a worthy undertaking.

University of Oxford

On Feb. 28 the degree of B.M. was conferred on Elizabeth Bevan John.

University of Cambridge

On Feb. 28 the following degrees were conferred:

M.D.—G. M. Barrett, J. W. Bromley, G. E. Ffrench, J. N. Horne, W. H. H. Jebb, C. P. Petch, Wilfrid Warren.

M.B., B.Chir.—E. H. Griffiths,* A. H. Jones, R. C. Roxburgh,* J. P. D. Thomas,* F. G. Tomlins.*

* By proxy.

University of Manchester

Mrs. Lapage has given £1000 to establish a prize in memory of her husband, the late Dr. C. P. Lapage, reader in the diseases of children in the university. The prize will be offered annually for award on the pædiatrics section of the final examination for the M.B. degree.

University of Otago

Dr. R. S. Aitken, whose appointment as vice-chancellor of the University of Otago is announced in our New Zealand letter (p. 420), has held the regius chair of medicine in the University of Aberdeen since 1938.

Professor Aitken, who is 46 years of age, was born and educated in New Zealand. After qualifying from the University of Otago in 1922 he held house-appointments in the Dunedin Hospital and a demonstratorship in the department of anatomy. In 1924 he came to Balliol College, Oxford, with a Rhodes scholarship, and worked on renal secretion and related problems in the department of physiology, taking the D.PHIL. three years later. He joined the medical unit of the London Hospital in 1926 as Owen Williams scholar and later became first assistant. When the British Postgraduate Medical School was opened in 1935 he was appointed to the university readership in medicine there, and he held this appointment till he took up his present chair. In 1937 he was elected F.R.C.P., and in 1938 he took his M.D. N.Z. He has published papers on hæmatemesis, on zinc protamine insulin, and on diseases of the liver. Dr. Aitken is a member of the Scottish North-eastern Regional Hospital Board.

1. London: Butterworth. 1947. Pp. 312. 42*s*.

Royal College of Physicians of London

Dr. F. J. Nattrass will deliver the Lumleian lectures at the college, Pall Mall East, S.W.1, on Tuesday and Thursday, April 13 and 15, at 5 P.M. He is to speak on Clinical and Social Problems of Epilepsy.

The college is holding a course of 25 postgraduate lectures in medicine at 5 P.M. between May 3 and June 25. Further particulars will be found in our advertisement columns.

Ophthalmological Society of the United Kingdom

The council of the society has awarded the Treacher Collins prize to Dr. H. S. Stannus for an essay on Nutritional Eye Disease.

Australian Fellowships

The Nuffield Foundation is offering annually, for the next 7 years, three fellowships in medicine to men or women who belong to Australia and who hold an Australian qualification. Further information will be found in our advertisement columns.

Royal Society for the Prevention of Accidents

On Wednesday, March 17, at 2.30 P.M., at Friends House, Euston Road, London, N.W.1, Mr. G. P. Barnett, chief inspector of factories, will give a talk reviewing the relationship of the factory inspectorate and industry.

Specialists to Visit Africa

The Nuffield Foundation is arranging for each of 18 specialists to pay two informal visits to East or West Africa during the next six years, in order to meet colonial medical staffs and to keep British schools in touch with medical matters in the Colonies and opportunities offered in the Colonial Service. The following have accepted invitations to start the scheme this year:

For East Africa.—Dr. G. L. M. McElligott, Prof. T. H. Davey (Liverpool), Prof. Alan Moncrieff.

For West Africa.—Dr. F. R. G. Heaf, Prof. Andrew Topping (Manchester), Dr. Douglas Miller (Edinburgh).

Radioactive Isotopes from U.S.A.

Since foreign distribution was announced by President Truman last September 44 shipments of radioactive isotopes have been sent from the United States to the United Kingdom, Australia, Canada, Argentine, Sweden, Denmark, Peru, and Italy; and arrangements have been made for shipments to 8 additional countries. The U.S. Atomic Energy Commission announces that the chief demand has been for radiophosphorus, to be used mainly for treatment of polycythæmia vera and chronic leukæmia and for studies of plant growth and phosphorus metabolism. Isotopes of iodine, carbon, sulphur, zinc, iron, and cobalt have also been exported for purposes of treatment or research. Countries applying for radioactive elements agree to submit to the commission six-monthly progress reports; and qualified scientists, irrespective of nationality, are allowed to visit laboratories where the isotope investigations are being carried out and to obtain information freely.

London County Council

Dr. J. A. Scott has been appointed deputy medical officer of health and deputy school medical officer, with effect from July 5.

Dr. Scott, who is 47, graduated at Liverpool in 1924, taking his D.P.H. two years later and his M.D. in 1927. After holding resident appointments in Liverpool, he joined the staff of the Surrey county council as an assistant medical officer. Thereafter he was successively M.O.H. for the urban district of Shipley, the county borough of Barnsley, and the metropolitan borough of Fulham; and in recognition of his Civil Defence services in Fulham he was appointed O.B.E. in 1941. Three years ago he joined Sir Allen Daley's staff at County Hall as a principal medical officer, and he has since been actively engaged in planning the new services for which the L.C.C. will be responsible under the National Health Service Act, 1946. He is lecturer on hygiene at St. George's Hospital and an examiner for the London M.D. The latest of his numerous writings on medical practice and administration is an introductory explanation of the National Health Service Act, published last year.

Also from the appointed day, Dr. Margaret Hogarth (now a principal assistant medical officer) will be senior medical officer for maternal health and the health of young children; Major-General J. P. Helliwell, M.R.C.S. (now consulting dental surgeon), will be chief dental surgeon; and Miss R. Dreyer (now matron-in-chief) will be chief nursing officer.

Dr. C. W. J. Ingham has been appointed a principal assistant medical officer from May 1, to fill the vacancy caused when Dr. E. J. Boome retires.

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Postgraduate Course on Rheumatic Diseases

On Friday, March 19, at 3.30 P.M., Prof. J. M. Mackintosh will open this weekend course which is being held at the rheumatism unit of St. Stephen's Hospital, Fulham Road, London, S.W.10. Sir Adolphe Abrahams, consultant physician to the hospital, will preside. Further particulars may be had from the Fellowship of Postgraduate Medicine, 1, Wimpole Street, W.1.

Scottish Committee for Care of the Old

The National Corporation for the Care of Old People announces the appointment of a Scottish committee, whose members are: Sir Hector Hetherington (chairman), Dr. A. Greig Anderson, Dr. A. D. Briggs, Dr. R. W. Craig, Miss Grace Drysdale, Prof. Thomas Ferguson, and Mr. H. L. F. Frazer. Mr. C. S. Gumley will act as hon. treasurer, and Miss E. V. Lowe has been appointed secretary; the offices will be at 2, St. Andrew Square, Edinburgh, 2.

Middlesex Appointment

Dr. A. C. T. Perkins, whose appointment as medical officer of health for Middlesex in succession to Dr. H. M. C. Macaulay has lately been announced, has been deputy M.O.H. for the county since May, 1940, prior to which he had served as principal assistant medical officer with the same authority since 1930.

Dr. Perkins, who is 50 years of age, was educated at Westminster School and King's College Hospital, where he held a Warneford scholarship. After qualifying in 1923, he held house-appointments at King's and the Brompton, and in 1924 he took the M.B. Lond. Three years later, after taking his D.P.H., he entered the public health service as assistant medical officer of health for West Suffolk, and while in the service of that authority proceeded to the M.D. His experience in this appointment provided the background for the essay on school preventive medicine in rural areas, for which the B.M.A. awarded him the Hempson prize in 1928.

The complete transactions of the Commonwealth and Empire Health and Tuberculosis Conference, held in London last July, have now been published, and are obtainable, price 15*s*., from the National Association for the Prevention of Tuberculosis, Tavistock House North, Tavistock Square, London, W.C.1.

'TRILITE INHALER' WITH MASK.—The makers of the trilite inhaler (*Lancet*, 1947, ii, 865) have devised a mask attachment for the inhaler which should overcome the objections raised by some patients to the standard nozzle (see Gunderson, E., Musgrove, F. *Ibid*, Jan. 24, p. 158).

Births, Marriages, and Deaths

BIRTHS

CORBIN.—On March 3, at Cudham, Kent, the wife of Mr. J. O. Corbin, F.R.C.S.—a daughter.
FRANKLIN.—On Feb. 28, at Cheam, the wife of Mr. R. H. Franklin, F.R.C.S.—a son.
HEADLEY.—On Feb. 29, in London, the wife of Dr. S. R. T. Headley—a son.
KEMP.—On Feb. 29, at Miri, Sarawak, the wife of Dr. J. W. L. Kemp—a son.
KNOX.—On Feb. 23, at Durban, the wife of Mr. Lance Knox, F.R.C.S.—a son.
LLOYD.—On March 2, the wife of Dr. O. G. Lloyd—a son.
ROWORTH.—On Feb. 27, at Swindon, the wife of Dr. Guy Roworth—a son.
SCOTT.—On March 3, in London, the wife of Dr. Leslie Scott—a daughter.

MARRIAGES

BAIRD—ANDERSON.—On March 6, in London, Major J. P. Baird, R.A.M.C., to Anne Patricia Anderson.
MATHESON—MACLAREN.—On March 6, in London, Thomas Swan Matheson, M.B., to Agnes Marjory Maclaren, M.R.C.S.

DEATHS

DAWSON.—On March 4, at Bromley, Kent, Kathleen Alice Dawson, M.D. Brux.
HALLAM.—On March 4, at Bridgwater, Philip Hallam, M.B. Edin., aged 68.
HAMILTON.—On March 5, at Beaconsfield, Dyddgu Hamilton, L.S.A., aged 82.
PHILLIPS.—On March 1, at Wotton-under-Edge, Glos, George Charles John Phillips, M.A., M.D. Camb., aged 83.
RIVERS.—On Feb. 28, at Redruth, Cornwall, Charles Henry Rivers, B.SC. Lond., M.A., M.D. Camb., M.D. Adelaide, M.R.C.P., aged 76.
RUSSELL.—On March 7, at Caterham, James Russell, M.A. Aberd., M.D. Edin., aged 84.
SYMES.—On March 2, William Johnston Symes, M.B. Durh.
THOMSON.—On March 1, at Pinner, Middlesex, John Duncan Thomson, M.A., M.B. Aberd.
WADE-EVANS.—On March 2, in London, Elizabeth Palmyre Wade-Evans, M.B. Glasg.
WHITE.—On March 3, at Guildford, Charles Francis Orr White, B.A. Camb., M.R.C.S., D.M.R.E., aged 69.

Appointments

University College Hospital, London:
BONHAM CARTER, R.E., M.B. Camb., M.R.C.P.: asst. physician, children's department.
LUCAS, B. G. B., M.R.C.S., D.A.: asst. anæsthetist.
ROBERTSON, A. I. G., M.B. Edin., D.A.: asst. anæsthetist.

Diary of the Week

MARCH 14 TO 20

Monday, 15th

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1
5 P.M. Dr. N. F. Maclagan: Blood and Urine Analysis in Relation to Medical Practice.
ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5 P.M. Dr. E. M. Darmady: Acute Uræmia. (Arris and Gale lecture.)
HUNTERIAN SOCIETY
8.30 P.M. (Talbot Restaurant, London Wall, E.C.2.) Dr. P. Ellman, Mr. Dudley Buxton, Dr. J. Aldren Turner, Dr. F. Cooksey: Neuritis.

Tuesday, 16th

ROYAL COLLEGE OF PHYSICIANS
5 P.M. Prof. A. J. Lewis: Treatment of G.P.I.
ROYAL COLLEGE OF SURGEONS
5 P.M. Mr. A. J. Gardham: Surgery of Malignant Disease of the Pharynx.
UNIVERSITY COLLEGE HOSPITAL, W.C.1
4.30 P.M. (Medical school.) Prof. G. R. Cameron, F.R.S.: Pulmonary Œdema. (Sydney Ringer lecture.)
INSTITUTE OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. I. Muende: Pathological demonstrations.
INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
5.15 P.M. Mr. E. D. D. Davis: Injuries of the Ear.
NATIONAL HOSPITAL, Queen Square, W.C.1
5 P.M. Prof. Th. Alajouanine (Paris): Loss of Cranial Tissue due to Trauma in Early Infancy.
EUGENICS SOCIETY
5.30 P.M. (Burlington House, Piccadilly, W.1.) Dr. W. Mayer-Gross: Mental Health Survey in a Rural Population.
ROYAL PHOTOGRAPHIC SOCIETY, 16, Prince's Gate, S.W.7
7 P.M. Prof. D. T. Harris: Stereoscopy.

Wednesday, 17th

ROYAL COLLEGE OF PHYSICIANS
5 P.M. Sir Lionel Whitby: The Common Anæmias.
ROYAL COLLEGE OF SURGEONS
5 P.M. Prof. Lambert Rogers: Surgery of the Spinal Cord.
HARVEIAN SOCIETY OF LONDON
8.30 P.M. (26, Portland Place, W.1.) Professor Alajouanine: Aphasia and Artistic Realisation. (Harveian oration.)
LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION
8.30 P.M. (B.M.A. House, Tavistock Square, W.C.1.) Dr. John Bowlby, Dr. Dorothy Makepeace, and Mrs. Madeline Robinson, J.P.: Juvenile Delinquency.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. F. S. Cooksey: Postural Defects in Childhood and Adolescence.

Thursday, 18th

ROYAL COLLEGE OF PHYSICIANS
5 P.M. Prof. R. V. Christie: Bright's Disease.
ROYAL COLLEGE OF SURGEONS
5 P.M. Mr. Rodney Maingot: Surgery of Peptic Ulcer.
ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE
7.30 P.M. (R.A.M. College, Millbank, S.W.1.) Demonstrations.

Friday, 19th

ROYAL COLLEGE OF PHYSICIANS
5 P.M. Professor Christie: Renal Function in Disease.
ROYAL COLLEGE OF SURGEONS
5 P.M. Mr. A. Dickson Wright: Varicose Veins and Ulcers.
MEDICAL RESEARCH SOCIETY
5 P.M. (St. Mary's Hospital Medical School, Paddington, W.2.) Prof. G. E. Burch (Tulane University): Radio-sodium Studies in Congestive Heart-failure.
FACULTY OF RADIOLOGISTS
2.30 P.M. *British Institute of Radiology and radiological section of Royal Society of Medicine.* (1, Wimpole Street, W.1.) Dr. A. S. Johnstone, Mr. A. L. d'Abreu, Dr. R. Fawcitt, Mr. Harold Edwards, Dr. J. L. A. Grout, Prof. Charles Wells: Diverticula of the Alimentary Tract.
NATIONAL HOSPITAL, Queen Square
5 P.M. Professor Alajouanine: Spinal Fluid and Cerebral Fluid.
LEEDS AND WEST RIDING MEDICO-CHIRURGICAL SOCIETY
7.30 P.M. Mr. C. Naunton Morgan: Diseases of the Anal Canal and Rectum.

The president of the National Government of the Republic of China has conferred the Order of the Brilliant Star with special cravat on Prof. W. P. Yetts, M.R.C.S.

During the three weeks' tour of Greece which he is making for the British Council, Sir Gordon Gordon-Taylor will lecture in Athens and Salonika on recent surgical advances and on cancer surgery.

Messrs. Eli Lilly and Co. Ltd. are vacating their London office on March 24. All future correspondence should be addressed to Basingstoke.

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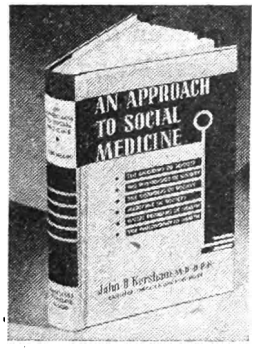

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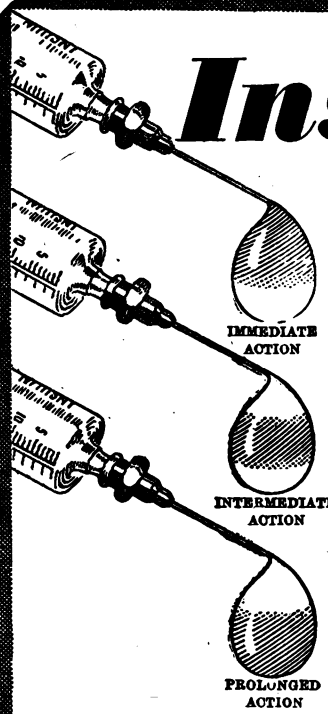

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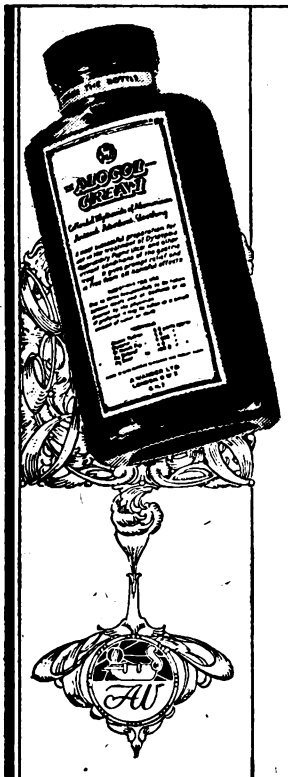

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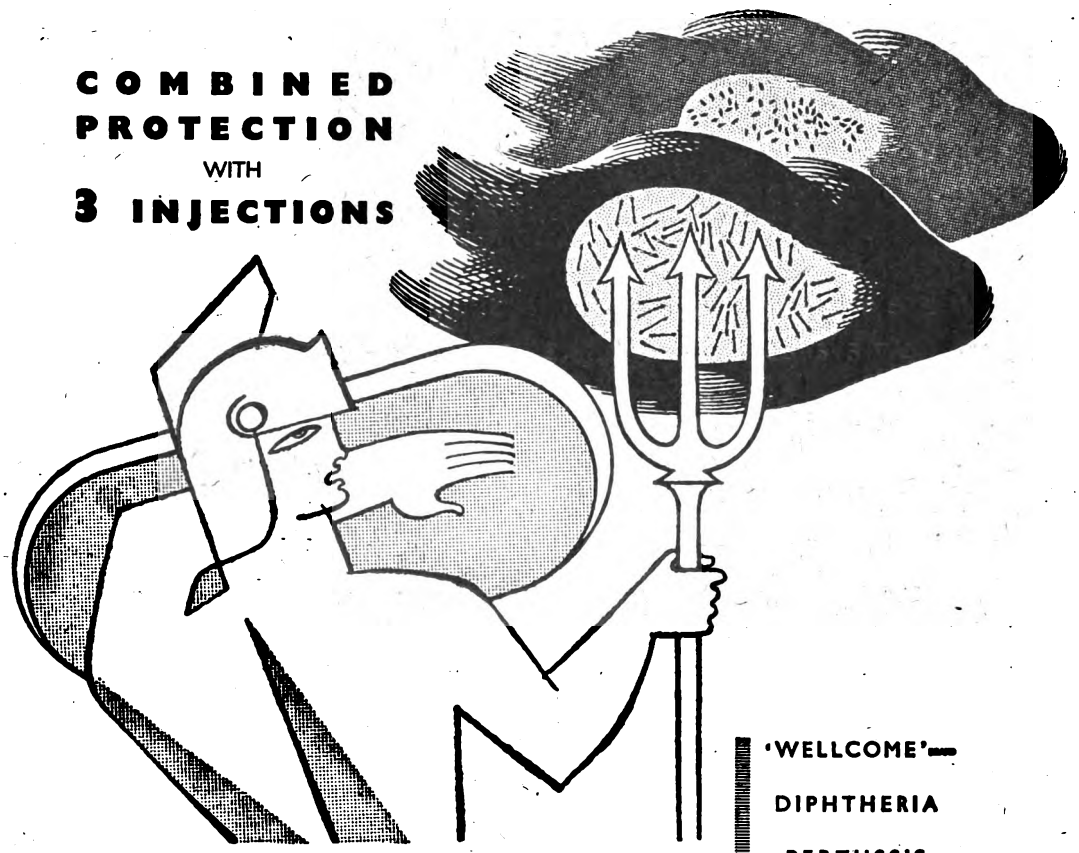

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THE FULL-TIME SPECIALIST*

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FOR many doctors a full-time career signifies an administrative, public-health, research, or professorial post. But there are today an increasing number of salaried full-time senior hospital clinicians, pathologists, and radiologists, the exact scope of whose work is not widely appreciated.

The scope of one of these full-time specialists includes not only care of inpatients and outpatient consultations but also teaching, research, staff rounds, and hospital administration. He must also extend his field of influence outside the four walls of the hospital and help in coördinating the medical services of the district and in developing good public relations.

A full-time specialist in a hospital serving a district needs only one yardstick to assess the scope of his work—the efficiency of the medical service to the public. Particular interests can be developed only when the routine medical requirements of the district have been served. The first responsibility is a coöperative interest in all types of cases affecting his specialty, "interesting" and "uninteresting," acute and chronic, young and old, with or without legal complications. The hospital serving a district must deal with abortions, elderly people with fractures, advanced cases of malignant disease, all of which in the past have been passed too often through the "voluntary" filter into the municipal hospitals. The management of a true cross-section of a disease process in the community provides a most interesting perspective and forms an excellent foundation for the superstruction of teaching and research.

The full-time clinician has a particularly good opportunity of attending to detail in his care of the hospital patient. There is great scope for improving the instruction given to hospital patients and to their relations. Too many patients still leave hospital without a clear idea of their illness or operation. Better instruction is particularly needed for patients with a chronic or recurring disease. With group talks, booklets, and even films one could do much more to overcome the ignorance and fear which militate against their keeping well. A simple explanation with good opportunities for asking questions does not alarm the average patient, and a detailed and authentic account of their trouble can and does increase their confidence in themselves and in their doctors. Instruction of patients and relations should not be left mainly to the junior staff but is a sphere of influence which can be particularly well developed by the full-time clinician. All this requires special organisation and cannot be done during busy outpatient sessions.

The full-time specialist can treat all classes of society. However conscientiously he may deal with his hospital patients, he will never achieve the full art of medicine unless he has contact with the educated and critical public. The management of "special" patients is accepted as part of the ordinary routine, even though it may take much longer to consider their problems. So far as medical care is concerned, all men are not equal. It is in no sense a political issue of giving one man better attention than another. Each patient is getting the best advice, but given in the way in which it can best be assimilated. Such patients need not be private or paying and need not in any way be made to feel that they are receiving preferential treatment. It may be argued that to give such patients any special attention would be unfair to one's colleagues in part-time service; again, would not such patients prefer to pay a fee? Both these difficulties could be overcome by having a staff fund to which anyone may contribute and which is available to all members of the staff for special academic expenses not normally covered by the National Health Service. For the full-time specialist to achieve the highest level of efficiency he must be able to continue to treat all grades of society.

At present the full-time specialist can undertake only limited domiciliary work, but this should be extended. It has already been developed for two emergencies—the premature baby and the difficult obstetric case. There are other groups of cases where home consultation might materially increase the efficiency of the medical service. Patients with diabetic coma are sometimes lost because the journey to hospital has been too disturbing for their sensitive circulatory state, whereas initial treatment at home might have tided them over sufficiently to stand removal to hospital.

Again, the position often arises where a patient has a severe or fatal illness but, though he is well attended by his doctor and in reasonable comfort, his relations feel that there is a chance that hospital treatment might save him. If it were possible to call in a consultant from the hospital, it might mean that a valuable hospital bed could be saved and the relations given the comfort of a second opinion, which should be regarded as a minimal requirement for those seriously ill. A general domiciliary consulting service by full-time specialists was originally envisaged by the Middlesex County Council but was not put into action because of pressure from within the profession.

TEACHING

Teaching is an essential part of the life of the full-time specialist. First, there are lectures to be given to the nurses. In the past this has too often been perfunctorily performed by one member of the senior staff, but it is much better for the course of lectures to be divided. Giving a good lecture to nurses on one's own subject is much more difficult than taking an advanced medical group. To extract the essentials, remove the dead wood which clutters up the textbooks on nursing, and add general interest is first-class practice and will lead to a more intelligent appreciation of modern medicine by the nurses. Full-time medical staff have a good opportunity to develop new methods of teaching nurses, particularly the use of poster demonstration of diseases and of medical films or filmstrip.

The training of junior medical staff is another important duty of the full-time specialist. The staff of one or two hospitals can easily contrive an occasional course of lectures for junior assistants taking their higher qualifications, and these have been successfully organised.

Postgraduate teaching will probably become a feature of most large district hospitals, with occasional refresher courses lasting 1–2 weeks for visiting general practitioners. These have been given at most of the Middlesex County Council hospitals. Two of the Middlesex County Council hospitals, the North Middlesex and Chase Farm, have recently amalgamated with the Prince of Wales's Hospital, Tottenham, to form the North London Postgraduate Medical Institute, which provides three-month courses.

If undergraduate teaching is given, special problems arise in a district hospital. It is very necessary for the patient to feel that he, and not the medical student, is the focus of interest. A patient coming half-way across England to a famous medical school expects to see medical students and to hear them taught. If he comes down the road to his local hospital he will not expect outpatient teaching on his case. It is perfectly

* Chairman's address to the Middlesex County Medical Society on Sept. 26, 1947.

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feasible to handle the cases in a natural way in the outpatient consulting-room and afterwards to discuss details with the students.

The full-time specialist may also be able to teach postgraduate visitors from the Commonwealth, India, Egypt, Turkey, and other countries who have been to the Postgraduate Medical School of London for six months and wish to work in a large hospital. There are very few posts available except as clinical assistants. Such assistants have proved most helpful in time-consuming investigations and research work and at the same time may profit by observing the clinical work of the unit. Many such postgraduate students are the best all-round men from their country. The full-time specialist can benefit from intellectual contact with these visitors and at the same time contribute to British postgraduate teaching.

STAFF MEETINGS

The medical staff round can be a salient feature in the life of the full-time specialist. With increasing specialisation it is most desirable that members of the staff should keep contact with the work and thought in other fields beside their own. Even in his own specialty the staff round may be the only time in a busy week when a particular medical problem is given full consideration. At the Central Middlesex County Hospital different types of meeting are organised. Some are purely clinical and include follow-up as well as inpatients. Other meetings are clinico-pathological in collaboration with a morbid anatomist, radiological demonstrations, or lectures by visitors. At least half the meetings are purely clinical and include everyday cases as well as rarities. It is just as interesting to consider the modern management of sciatica as to contemplate a case of periarteritis nodosa. It is possible that some physicians, surgeons, and obstetricians may prefer to have their own staff rounds; but, even so, they can be encouraged to meet on common ground from time to time. These meetings are much easier to organise when the staff are predominantly full-time and, indeed, they are one of the real assets of full-time medicine. They not only maintain good contact with one's colleagues but also provide good practice for junior as well as senior staff in the art of presentation of cases. In a busy district hospital it may be impossible to allocate a full morning or afternoon to such meetings. A convenient time to hold them is at 11.30 A.M., which allows good opportunity of attending to one's ward first, and luncheon time will automatically prevent the meeting from lasting too long.

There is another form of meeting which is of considerable value—a short weekly meeting of the staff of one unit, together with the almoner, to review the notes of patients discharged in the previous week. Arrangement can be made for short or long follow-up.

The full-time medical staff have particularly good opportunity of attending post-mortem demonstrations, and there is no better way of maintaining a humble appreciation of our individual and collective ignorance. With a busy ward or outpatient session it is usually impossible to see the necropsy performed, but a demonstration at 1.30 P.M. is an admirable way of starting the afternoon's work.

RESEARCH

Clinical research can be as much a part of the routine of the full-time specialist as ward or outpatient work. Those working in district hospitals have a great advantage over general practitioners in that they can investigate their cases fully. They have a particular obligation therefore to see that full value accrues from the detailed records. In the past it has sometimes been assumed that research is beyond the ability of those engaged in routine municipal hospital work, and the responsibility for this work lay with the professorial units. Research in its sense of "examining again" is the duty of the full-time specialist and district hospitals. There is still tremendous scope for simple clinical observations on treatment and prognosis. What is the prognosis of peptic ulcer in old age? What is the best management of acute suppression of urine? What is the present mortality of abortion, and what are the factors still concerned? There are few who could not pose some question as the result of their hospital experience. There is no reason why fundamental physiological research should not be undertaken, but this may properly be regarded as the province of the professorial units who have easy access to other university faculties. It is improbable that full-time specialists in district hospitals will open up new highways of medical progress, but in the intervals between the great discoveries there is much to do to maintain steady advance in the knowledge of disease. There is particular need for planned long-term clinical observations. A common method in the past has been to decide to review, for example, all the cases of partial gastrectomy in the past ten years. The notes are taken from the records office, and the patients are written to, but invariably many can no longer be traced, with the result that it is impossible to place much value on the picture presented by those who have replied. Further difficulties may arise if a questionnaire is used; important details may be missing from the notes. Good proleptic series are still urgently needed, and all patients coming within a particular group must be seen at intervals. This type of clinical research is well suited to district hospitals, where most of the patients live within easy distance.

COÖRDINATION OF HEALTH SERVICES

The full-time specialist has a further responsibility in assisting to coördinate the hospital medical service with the other health services in the district. He is at a disadvantage compared with part-time colleagues, who may meet general practitioners at domiciliary consultations. It is most desirable to maintain a personal contact with the doctors working in the same district. A ward round, or a clinical meeting every 1–2 weeks, and varying days open to all local practitioners are probably the best method of doing this. The atmosphere should be one of discussion rather than didactic instruction. The local practitioners are colleagues concerned with mutual problems and should not be subject to formal teaching. Revision courses are really best suited for doctors outside the hospital district. It is equally necessary to maintain good personal contact with local industrial officers of health, school medical officers, and doctors working in local public-health departments. When two or more groups of doctors are concerned with the same patients, there should be good opportunities of mutual consultation; it is remarkable how much coördination of medical effort remains to be achieved. Meetings could be organised for local factory nurses, and surgical staff could coöperate with the medical officer of health in propaganda for safety devices in the home. Local voluntary health associations may be very glad of the support of hospital staff on their committees. Such activities are normally accepted by many busy hospital honorary staff, but they can be equally accepted by full-time specialists. Indeed, such commitments should be regarded as part of the responsibility to the medical service.

ADMINISTRATION

The full-time specialist accepts an active share in the administration of the hospital through the medical staff committee. The development of the medical staff committee has been a landmark in the development of municipal medicine. In the future it seems probable that hospital administration may pass into lay hands; it is therefore particularly important that the senior

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clinicians should carry a fair burden of administration through the medical committee. With a substantial nucleus of full-time staff it is probably easier to organise the subcommittee work, which may reach appreciable dimensions in an expanding service. The senior staff must maintain a position in which they can influence the development of the hospitals.

The senior staff must also play their part in maintaining a good spirit in the hospital community. They must help to foster those good relations which are the first essential for a contented and efficient hospital unit.

PUBLIC RELATIONS

Public or municipal hospitals have so far had a singularly bad press compared with the voluntary hospitals. Apart from coroners' inquests, the local municipal hospital may get few references in the local press in contrast with the neighbouring voluntary hospital. The fault is to a large extent with the municipal hospitals, which have not attempted to develop their public relations. Under the new health service it is important that all district hospitals should foster local interest, and the full-time staff should accept a share in assisting such efforts. At St. Bartholomew's Hospital there is an annual view-day in May, when the wards are visited ceremoniously by the Board of Governors and tea is served for friends and relations of the staff and for others who wish to come. In a few years such an annual fête could be weaved into local life and help to maintain a personal contact with local associations.

The medical staff can help towards good relations, particularly with local doctors, by producing an annual report on the medical work of the hospital, which can be circulated to general practitioners and the local press. Such a report can include an administrative survey by the medical director, the main statistical facts relating to the hospital work, and brief informative and interesting reports from each medical department. This year an annual report on these lines has been published from the Central Middlesex County Hospital.

ORGANISATION

The perspective of all these activities must be emphasised. The care of patients is the essential work which will need the major part of the time-table. All these added commitments must be grafted on to this basic responsibility. It cannot be pleaded that there is too much clinical work to allow time for reading and research. The high standard of work expected from those in charge of hospital beds cannot be maintained unless there is constant contact with medical thought elsewhere. If there is too much clinical work, further assistance is needed. In peace-time one would fail in one's duty if the small part of one's time for reading were sacrificed regularly to routine work.

If it is considered that this gives a correct interpretation of the responsibility of the full-time specialist, it will be necessary to agree on some essential details of organisation of the work.

Such full-time specialists need a team consisting of a chief assistant, registrar, and houseman responsible for 50–100 beds and outpatients. It is impossible to envisage a comprehensive conception of duties if supported only by junior house-officers. Some degree of specialisation is essential, and this can be organised, particularly round special outpatient clinics. It is, however, desirable that inpatient work should include a cross-section of general medical and surgical cases admitted as emergency cases. When a particular condition is being intensively studied, there is good ground for arranging for all such cases to be admitted to one department. It is very necessary always to bear in mind the effect this may have on the nurses. For instance, it would be impossible for all hemiplegics to be admitted to one acute ward. Certain emergency cases, such as diabetic coma, are probably best admitted under one unit; the number per year is relatively small, and experience in their management is particularly essential if good results are to be achieved. The ease with which special direction of patients can be arranged for research or expediency is a particular feature of work among full-time specialists.

It is unnecessary for a full-time specialist to work at one hospital only, but it is essential that he should have a dominant interest in one centre, which should absorb at least two-thirds of his professional life. It is both refreshing and stimulating to have some duties at other hospitals. Some may think this may entail loss of useful time by travelling; but it is a refreshing break in the day to drive from one hospital to another and considerably less tiring then to return at once to outpatient or ward work.

The full-time specialist needs good library facilities. An expenditure of £75–100 p.a. on medical journals is a small item in the budget of a large hospital and pays good dividends in bridging the gap between knowledge and practice. It is important to be able to refer at once to articles when a point of treatment or diagnosis is in doubt. Our hospital library has a nucleus of the following journals:

Quarterly Cumulative Index Medicus
British Medical Journal
Lancet
Proceedings of the Royal Society of Medicine
Journal of Pathology and Bacteriology
Quarterly Journal of Medicine
Journal of the American Medical Association
New England Journal of Medicine
Annals of Medicine
Archives of Internal Medicine
Acta Medica Scandinavica
British Journal of Surgery
Annals of Surgery
Surgery, Gynecology and Obstetrics
Surgery
Journal of Obstetrics and Gynæcology
American Journal of Obstetrics and Gynecology
World Abstracts of Medicine, Surgery, and Obstetrics
Nature
Clinical Science
American Journal of the Medical Sciences
Journal of Clinical Investigation
Journal of Industrial Medicine

In addition, specialist journals on pædiatrics, cardiology, gastro-enterology, anæsthetics, pathology, &c., are taken as desired by members of the medical staff, making a total of 53 journals. The library contains a few standard textbooks of reference but no specialist books of interest to only one member of the staff. Such books are acquired by the staff themselves. A small medical subcommittee is responsible for the library, and some part-time clerical assistance is also needed.

For clinical research it is particularly important to have a good records department. It is essential to be able to trace notes referring to a particular disease or symptom. The provisional classification of diseases[1] drawn up for the Medical Research Council is in many ways preferable to the American Logie system. The numerical coding can be performed satisfactorily by a clerk, but it is necessary for a member of the medical staff to be available for advice when there are any difficulties in medical terminology. It is extraordinary how slow hospitals have been in developing satisfactory records departments. They must not be regarded as the prerogative of teaching hospitals but are a necessary feature of every district hospital.

Besides being able to trace case-records of particular diseases, it is necessary to have a good system of collecting

1. *Spec. Rep. Ser. med. Res. Coun., Lond.* 1944, no. 248.

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and maintaining medical references on the subjects of particular interest. Many doctors, even in senior posts, are unaware of the *Quarterly Cumulative Index Medicus*, which enables one to trace quickly the world publications on a particular subject. It is not necessary to have a complete set, for past references can always be looked up at a reference library, but it is of value to add new numbers to the library so that recent references can be checked. The keeping of medical references may be done either with a card index or with folders. A convenient system is to make out a card to be filed away in an index cabinet and to write for a reprint. When this arrives it may be filed away in a folder in a cabinet. The Shannonblic folders are particularly useful for quick reference.

Most full-time staff have yet to learn the great help which they could derive from experienced personal secretaries—a lesson well known to those in private consulting practice. Such personal assistants can ensure the adequate keeping of all medical records and can treble the output of original work from a medical unit. Senior medical staff who are keenly interested in their specialty and can see the problems of their work in a perspective of 10–20 years should make certain that their special experience is not lost for want of sufficient secretarial aid.

Full-time work cannot be done in office hours but will often encroach on evenings and weekends; and, in view of the wide responsibilities of the work it is impossible for this to be otherwise. An attempt should be made to organise at least one session each week for library or research work.

CONDITIONS OF WORK

Good conditions of work are essential if a continuously high level of efficiency is to be maintained. Good holidays are very necessary. A busy full-time specialist will draw on his capital of energy, and his reserves must be restored by a real holiday. Besides, his perspective of life cannot be really maintained if he has too little contact with the green fields, the seas, and the mountains. For the senior clinician at least six weeks' proper holiday is needed and further leave for medical meetings. It is very necessary for full-time staff to attend conferences and meetings which are concerned with his work, wherever they may be held.

It should also be possible to arrange for special leave for travel or research. Sabbatical leave would greatly increase the efficiency of a medical service. The rate of progress of medicine today and the expanding contacts with other faculties make it increasingly difficult to maintain a true perspective.

In assessing remuneration one must allow for superannuation and paid sick-leave and holidays, in comparing the salary with those in private practice, but provision must also be made for the impossibility of getting allowances for many professional expenses which a full-time specialist may incur—e.g., purchase of books, expenses of car, &c. If there is to be a great increase in the number of full-time specialists under the National Health Service, it would be most desirable for the prestige of medicine in general and full-time specialists in particular if there were a number of highly paid posts for clinicians, rewarded on the same remunerative standards as the senior posts in the legal profession.

CONCLUSION

A liberal interpretation of the scope of activities of the full-time specialist would tend to diminish the risk of over-specialism. The full-time hospital physician or surgeon would remain primarily a clinician who has the widest possible perspective of medicine and human relations.

The main reason for being satisfied with full-time specialism is that the great majority of our work is done at one centre with the same team, and when we have "special" patients they are seen at our own hospital with all its resources for investigation. This seems an advance on the system of dividing one's work into part-time hospital duties and private consulting work elsewhere without the convenience of the ancillary departments under the same roof. If private practice can be pursued with all the advantage of hospital service, the question of private fees becomes less important and some of the present advantages of full-time specialism would disappear. There are reasons why salaried specialism can be preferable to part-time private practice. The full-time specialist can take a much more active part in public life without fear of accusation of self-advertisement. For those interested in developing large-scale research or fostering better public relations this is an important aspect. Many may appreciate the diminished incentive to cultivate a reputation for infallibility in local medical circles.

It is generally recognised that the Middlesex County Council has provided an efficient and comprehensive hospital service, and part of its credit is due to their policy of having a firm nucleus of full-time specialists at each of their hospitals.

The experience of these specialists has shown that, with complete professional freedom and a share in the administration, their work has provided a particularly satisfying career. Not only have they treated the sick under ideal conditions, but also they have played their part in the prevention of ill health by research in the wards of the hospital or by helping to control environmental factors in the district in which they serve.

The introduction of full-time staff into hospitals throughout the country would raise the standard of records and attention to detail in the same way as the full-time professorial units influence the London teaching hospitals.

If full-time hospital service is made financially attractive, no doubt there will be a large entry of energetic and ambitious men and women keenly interested in medicine. The economy of their effort, which would be achieved by the concentration of their work into efficient units, would be equivalent to a large numerical increase in specialist advice for the country. Part-time or independent specialism will certainly continue to flourish, to satisfy the very reasonable desire for an independent second opinion by the public. The competition of efficient hospital units may well eliminate the pseudo-specialist. The independent consultant by virtue of his seniority and personal fame will remain a true safeguard for the public and a source of inspiration for those in full-time medicine.

I wish to record my appreciation to many colleagues with whom I have discussed this subject and whose work has contributed the final picture which I have presented.

"... The structure thus far made manifest in the bacterial cell, even with the aid of the electron microscope, is much simpler than the remarkable synthetic capacities of bacteria would seem to require. Cells of many kinds of bacteria, furnished only with water, salts, glucose, and simple sources of carbon and nitrogen, can synthesize proteins, complex carbohydrates, lipids, ribose, and desoxyribose nucleic acids, growth accessories and enzymes, all organised into characteristic and reproducible protoplasmic systems. The cell can reproduce itself and divide within half an hour at body temperature. These feats of chemical synthesis and organisation, which cannot be duplicated by the finest chemical laboratories in existence, are accomplished within a cell a few microns in length and less than a micron in diameter. The plain facts would seem fantastic if they were not so familiar."—Prof. STUART MUDD, *Nature, Lond.* Feb. 28, p. 302.

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ASSESSMENT OF INTESTINAL CARMINATIVES

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THE value of different remedies for expediting the passage of flatus from the bowel can be assessed by a simple method which has apparently not been used before.

The patient receives an ordinary diet, and no purgatives or other drugs are given. After his bowels have moved normally, it is confirmed digitally that there are no fæces in the rectum. In the early stages of this investigation proctoscopy was also done, but it was discontinued because unnecessary. A self-retaining soft rubber catheter (size 8 or 9) is lubricated and passed about 2 in. beyond the anal sphincter. The free end, secured to the inner aspect of the thigh with a length of bandage or adhesive strapping, is connected with a glass adapter to a piece of thick-walled rubber tubing long enough to reach the foot of the bed. Here the tubing leads to a 500 c.cm. glass measuring cylinder inverted in water to act as a gas jar, and this is conveniently placed on a bed-table near enough to the patient to enable him to read the gradations (fig. 1). As bubbles of gas displace the water column downwards, the patient records the new level and the time at which the evacuation took place. So far as the passage of flatus is concerned, the patient's rôle is entirely passive; neither straining, coughing, nor the ordinary physical activity of sitting and moving in bed affects the output of gas.

As a rule volumes of gas amounting to about 30 c.cm. are evacuated several times in an hour. Sometimes as little as 2 c.cm., but occasionally as much as 80 c.cm., is evacuated spontaneously. It often happens, however, that no gas is expelled for an hour or more. Technical difficulties were expected from blocking of the catheter by fæces or mucus, but in practice this rarely happened so long as the patient's bowels had moved satisfactorily before the experiment. The only reliable method for checking the patency of the catheter is to remove it for inspection; coughing and straining cause perceptible fluctuations in the level of the water meniscus in the glass delivery tube not only when the lumen of the catheter is clear but also when liquid fæces have entered the tube and obstructed the passage of flatus.

It may be doubted whether it is possible to carry out adequately controlled experiments on the effectiveness of intestinal carminatives. There are obviously so many variables that fallacious deductions seem almost inevitable. Thus the gas content of the intestine is constantly varying quantitatively and qualitatively as a result of diffusion through the intestinal capillaries (McIver et al. 1926b). The volume of the intestinal gases (a mixture of nitrogen, methane, carbon dioxide, and oxygen) is materially affected by many chemical and physical reactions taking place not only in the lumen of the alimentary canal but also in the blood-stream and even in remote tissues of the body. It has been shown experimentally by Tacke (cited by Cutting 1932) that ten or twenty times as much intestinal gas may be excreted by the lungs as is expelled rectally. The volume of flatus passed daily has been estimated at 500–1000 c.cm. by Fries (1906) and by Beazell and Ivy (1941); but there appear to be considerable variations from one person to another and in the same subject from day to day. If the experimental subject is one who normally passes little flatus, the circumstances do not lend themselves to the assessment of intestinal carminatives. A little experience of the method described here suffices to show that, in analysing results, due allowance must be also made for the postprandial evacuation of gas recorded in the majority (66%) of the experiments. Any attempt to provide an adequate control period necessitates testing seriatim the various therapeutic measures under consideration. From what has already been said, it is clear that only on the rarest occasions, and then merely by chance, are the conditions in the bowel at different times of the day likely to be strictly comparable. Thus it is feasible that susceptibility to the action of carminatives and other measures may vary with the amount and nature of the food in the intestine and its state of digestion; and various psychological factors may also have a bearing on the findings.

SCOPE AND RESULTS OF THE INVESTIGATION

Notwithstanding the reservations already indicated, an attempt was made to assess the value of some of the remedies in common use. The control period usually lasted from about 11 A.M. to 2 P.M. During this time the patient took nothing by mouth except his midday dinner. A spontaneous postprandial evacuation of gas amounting to about 100 c.cm. took place in most patients within an hour of beginning the meal, and it lasted 20–30 min. (fig. 2). About an hour after this had subsided various therapeutic measures were tried with the object of increasing the output of flatus.

The effect of sipping a cupful of hot water was observed first. After 15 min. the same quantity of hot water was given again, but with the addition of a pungent carminative mixture (compound tincture of cardamom and aromatic spirit of ammonia, 60 minims of each); with this, most of the patients became flushed and sweated gently, and belching was often noted.

Next the effect of hot turpentine stupes applied to the abdomen was investigated. Thick pieces of flannel were applied to the whole of the anterior surface of the abdomen and were used as hot as could be tolerated by the patient, being changed at intervals of about a minute for a quarter of an hour.

In a further series of 9 patients radiant heat was applied to the abdomen from a bed cage fitted with electric lamps; the treatment lasted about 30 minutes.

Finally, in this group of experiments, a large dose of posterior-pituitary extract (8–10 units) was given intramuscularly. The data were recorded graphically for analysis (figs. 2 and 3).

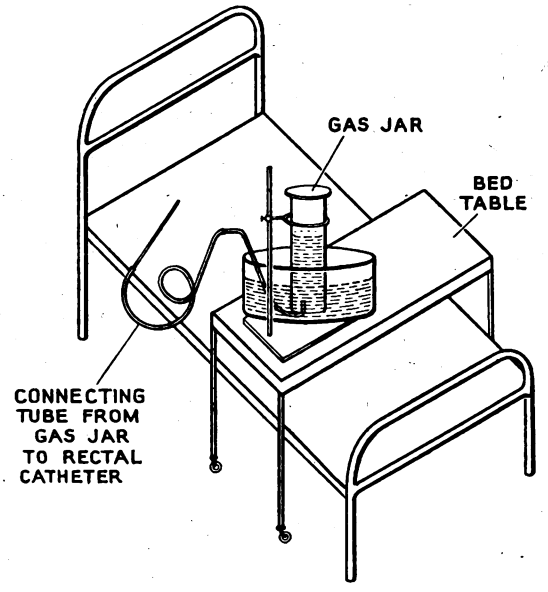

Fig. 1.—Apparatus for collecting and measuring flatus.

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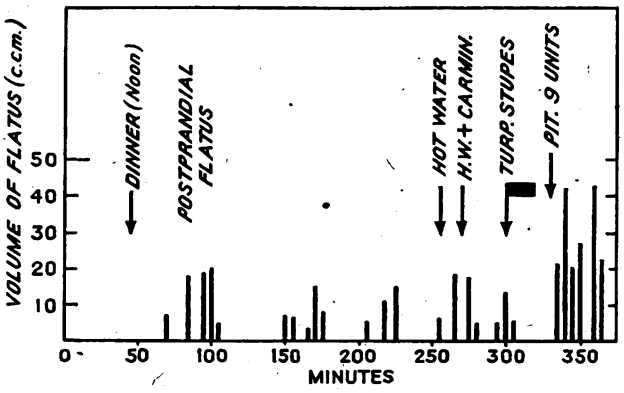

Fig. 2—Chart showing characteristic postprandial passage of flatus, ineffective action of carminative mixture and turpentine stupes, and effective action of pituitrin 9 units.

With the same general procedure, further tests were carried out to ascertain the effects of (1) small doses of 'Pituitrin' as compared with large doses; (2) pituitrin given about half an hour after dinner to determine whether it would be more effective at the time of postprandial evacuation of flatus; (3) pituitrin after intravenous injection of atropine sulphate gr. $^1/_{100}$; and (4) combined treatment with pituitrin and physostigmine salicylate gr. $^1/_{100}$, and intramuscular carbachol 0·5 mg.

The results were as follows:

Method	*Total*	*Success*	*Failure*	*Doubtful*
Hot water 4 oz. sipped ..	12	0	12	0
Carminative in hot water	24	0	23	1
Hot turpentine stupes ..	23	1	20	2
Radiant heat	9	1	7	1
Pituitrin 8–10 units ..	34	30	1	3
Pituitrin 3 units	5	1	4	0
Pituitrin after dinner ..	4	0	4*	0
Pituitrin after atropine ..	5	0	4*	1
Pituitrin and physostigmine	12	4	8	0
'Prostigmin'	13	4	8	1
Carbachol	8	1	7	0

* Ordinary effect of pituitrin not enhanced.

DISCUSSION

A comprehensive critical review of ileus and related gastro-intestinal complications, including a bibliography containing 251 references, has been published by Gius and Peterson (1944).

The treatment of gaseous distension of the bowel depends in the first place on diagnosis; this is emphasised by Alvarez (1942). There are occasions, especially in the management of surgical conditions, when the principal therapeutic aim is to produce intestinal quiescence in the hope that spontaneous absorption of gas will take place, thus averting serious complications. The effect of morphine in producing this favourable outcome has long been recognised and has been the subject of clinical and laboratory research, notably by McIver et al. (1926a). Nevertheless, in most cases of intestinal distension an attempt is usually made to facilitate the passage of flatus.

Plant (1920–21), working on unanæsthetised dogs, found that volatile oils in concentrations similar to those used by the clinician caused relaxation of the stomach and an increase in the tone and contractions of the small intestine and colon. In the present investigations in man carminatives did not affect the output of flatus in 23 out of 24 trials. The application of heat to the abdominal wall either as turpentine stupes or as radiant heat succeeded only twice in 32 tests.

Among others, Hurst (1942) has reported favourably on the value of 'Pitressin' in relieving tympanites as judged by expulsion of flatus and relief of the patient. In the present investigation intramuscular pituitrin was almost invariably effective when used in large doses (8–10 units). Side-effects, such as colic, headache, and sweating, were rarely severe, but blanching always took place and was apt to cause undue concern among observers unfamiliar with the intense vasoconstriction caused by pitressin. Pallor became apparent about 5 min. after the injection, and flatus was evacuated some 10 min. later; defæcation commonly took place within an hour.

In small doses (3–5 units) the action of pituitrin on the bowel was unreliable. Preliminary atropinisation of the patient did not enhance the effect of pituitrin; but in these patients, who were in the acute or convalescent stages of pneumonia, intestinal spasm was not a factor when treatment was given; otherwise benefit might have resulted from the simultaneous use of atropine. An attempt to produce an exaggeration of the normal postprandial output of flatus with pituitrin succeeded in only 1 of 5 patients; the result was no better than might have been expected from pituitrin given at any other time.

Using the isolated human appendix Cross (1924) confirmed W. C. Gunn's previous finding of genuine synergism between pituitrin and physostigmine. He then tested this combination of drugs in 15 patients with gross tympanites, giving pituitrin 5 units and physostigmine gr. $^1/_{100}$, and claimed that in 5 of the patients, where the distension was severe and the general condition desperate, relief was dramatic: "so far, no case thus treated has failed unless there was unsuspected mechanical obstruction." Cross assessed the value of treatment by observing improvement in the patient's general condition, subjective reports, and noting that flatus was passed; the output of gas was not measured, nor were changes in abdominal girth recorded.

This synergistic action has been confirmed in 4 out of 12 experiments in the present research. Small doses of pituitrin and of physostigmine, given separately, each produced characteristic side-effects but no significant increase in the output of flatus. Later in the day the drugs were given simultaneously in the same doses, and this was followed by a considerable increase in the volume of flatus passed (fig. 4). The effect, however, was not greater than what might have been expected after a full dose of pituitrin alone; and, in view of the numerous failures which followed the simultaneous use of pituitrin and physostigmine, this treatment has little to recommend it.

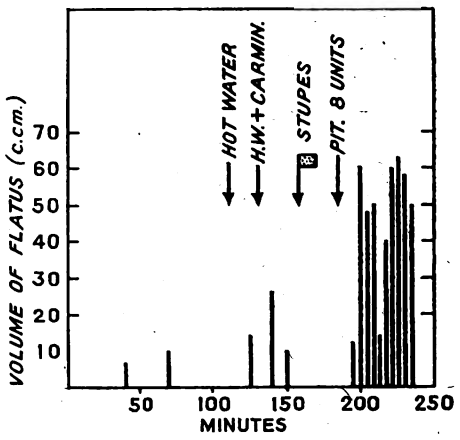

Fig. 3—Chart showing failures with carminatives and stupes but good result from pituitrin 8 units.

Intramuscular prostigmin in doses of 0·5 mg. was disappointing, and side-effects, such as colic, sweating, bronchospasm, and bronchorrhœa, were troublesome. Of 13 patients who received prostigmin, the output of flatus was increased in only 4, and in 2 of these the drug

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was given intravenously. Simultaneous injection of pituitrin and prostigmin in 2 patients did not produce any evidence of synergism. Intramuscular carbachol 0·5 mg. was effective in only 1 of 8 trials.

CONCLUSIONS

Of the measures available for increasing the output of flatus from the bowel pituitrin is the most valuable. The action is produced by the vasopressor fraction, and this should be used instead of pituitrin if there are contra-indications to the injection of oxytocin and the antidiuretic hormone.

A point of great practical importance is that the rectum should be empty before posterior-pituitary extract is given for the relief of tympanites. If necessary this should be ensured by giving a simple enema and

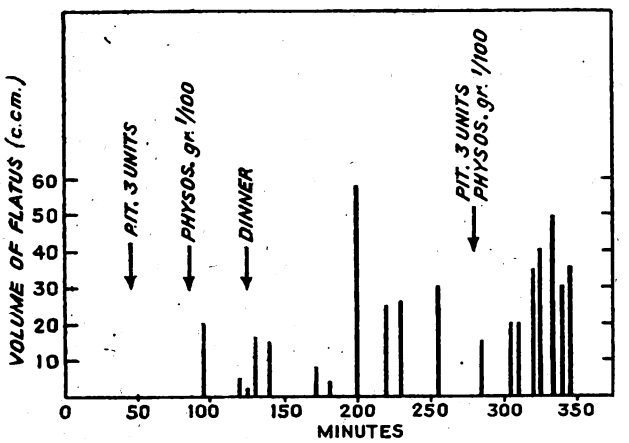

Fig. 4—Chart showing synergism between pituitrin and physostigmine.

allowing what remains of the enema fluid to drain into a urinal through a rectal tube or a self-retaining catheter. After about 10 min., the rectal catheter still being in situ, pituitrin 8–10 units should be administered. The value of the rectal catheter lies in its allowing small volumes of gas (10–20 c.cm.) to escape freely. This is of particular importance in the case of patients who are too weak to pass flatus voluntarily and whose difficulties may be still further aggravated by excessive tonicity of the sphincter ani. The evacuation of comparatively small volumes of gas (200–300 c.cm.) often gives an extraordinary degree of relief to patients with tympanites.

SUMMARY

A simple clinical method is described for assessing the value of intestinal carminatives.

Among the measures which had no effect in increasing the output of flatus were oral administration of a carminative mixture, hot turpentine stupes to the abdomen, radiant heat, and the injection of carbachol.

Physostigmine and prostigmin were only occasionally effective in increasing the output of flatus, and their unpleasant side-effects prohibited the use of large doses.

The synergistic effect of pituitrin and physostigmine administered simultaneously was seen in less than half of the patients tested, and from a clinical point of view it did not seem to be important.

Provided the rectum was empty and a rectal tube or in-dwelling catheter was used, the intramuscular injection of full doses of pituitrin gave satisfactory results in about 90% of the tests.

We wish to thank Dr. A. D. Briggs, medical superintendent of Stobhill Hospital, for permission to publish this paper, and we are indebted to the late Prof. Noah Morris for his interest in the research.

References at foot of next column

ACTINOMYCOSIS OF THE LIVER WITH RECOVERY

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ACTINOMYCOSIS, which is not very uncommon, was first described in cattle by Bollinger (1877) and first recognised in man by Ponfick in 1879 (see Ponfick 1882). The first detailed clinical account of the disease in man, based on 38 cases, was given by Israel (1885).

Of 1330 cases reviewed by Cope (1938) 56·8% affected the cervicofacial region, 22·3% the abdomen, 14·9% the thorax, and 5·9% other sites.

It was formerly maintained that the actinomyces gained access to man through the patient sucking contaminated hay or straw; but this view must be abandoned, since the fungus obtained from vegetable sources which grows readily under aerobic conditions at room temperature is not the one found in human cases and in the lumpy jaw of cattle, which is anaerobic and grows only at about body temperature. Differences in morphology and in reactions have also been demonstrated between the human and bovine strains of actinomyces, and it has been shown by Naeslund (1925), Lord (1933), and Emmons (1935) that anaerobic strains corresponding to the pathological human *A. israeli* type occur as saprophytes in the mouths of normal persons. In certain circumstances—e.g., trauma—they may become parasitic and cause disease. Transmission of the infection from animal to man has not been observed with certainty (Cope 1938); nor has transmission from one person to another (von Baracz 1902).

Abdominal actinomycosis starts as a rule in the right iliac fossa, probably because fæcal concretions abrade the mucosa and because the secondary pathogenic organisms present favour the growth of the ingested fungus. Actinomycosis of the liver is usually secondary to a focus in the right iliac fossa, through the portal vein; but the liver is sometimes reached from the stomach, colon, rectum, or lung, or in a generalised actinomycotic septicæmia. The liver infection takes the form of abscesses—single, multiple, and often honeycomb—and is commonly fatal. Chitty in 1944, recording a recovery, states that he could find no other on record, and since then but few have been reported. In the following severe case the patient's life was saved by persistent and thorough treatment.

CASE-RECORD

A boy, aged 9 years, was operated on for acute appendicitis in November, 1944. In March, 1945, he was admitted to a children's hospital with two months' history of pain in the right iliac fossa and loss of weight. Erythrocyte-sedimentation rate 75 mm.; white-cell count 20,000 per c.mm. At laparotomy the surgeon found nothing abnormal in the appendix region, but noted an enlarged liver adherent to surrounding structures. Actinomycosis of the liver was diagnosed but not confirmed pathologically.

PROF. ALSTEAD, DR. PATTERSON: REFERENCES

Alvarez, W. C. (1942) *J. Amer. med. Ass.* **120**, 21.
Beazell, J. M., Ivy, A. C. (1941) *Amer. J. digest. Dis.* **8**, 128.
Cross, D. G. T. K. (1924) *Brit. med. J.* i, 9.
Cutting, R. A. (1932) Principles of Preoperative and Postoperative Treatment. New York.
Fries, J. A. (1906) *Amer. J. Physiol.* **16**, 468.
Gius, J. A., Peterson, C. G. (1944) *Surg. Gynec. Obstet.* **79**, *Int. Abstr. Surg.* 265.
Hurst, A. (1942) *Lancet*, i, 223.
McIver, M. A., Benedict, E. B., Cline, J. W. jun. (1926a) *Arch. Surg., Chicago*, **13**, 588.
— Redfield, A. C., Benedict, E. B. (1926b) *Amer. J. Physiol.* **76**, 92.
Plant, O. H. (1920–21) *J. Pharmacol.* **16**, 311.

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Patient was sent home, but was readmitted in September as an abscess had appeared in the abdominal wall. This discharged, and the resulting sinuses were explored, penicillin being used locally and systemically. In January, 1946, the sinuses were again explored, and in the following month he was transferred to a base hospital, where sulphur-yellow granules were found in the pus and confirmed as *A. israeli*.

Intramuscular penicillin was given, 1,400,000 units in 14 days, and penicillin solution (500 units per ml.) was instilled daily into the sinuses.

On March 20 he had passed a large amount of fresh blood per rectum and was given three blood-transfusions; two were of 1 pint each, but in the third only 50 ml. of carefully grouped and cross-matched blood was given, as he developed a severe rigor, profuse vomiting, and pyrexia (105·2°F). He was also given small doses of potassium iodide (gr. 2½ t.d.s.); he was said to have shown symptoms of iodism on gr. 5 t.d.s.

On admission to Mount Vernon Hospital under my care on April 1 he was apparently moribund, very pale, and emaciated, with distressing cough and considerable dyspnœa. Abdomen distended; liver enlarged and painful; three discharging sinuses in upper abdomen. Veins dilated over thorax. Chest expanded poorly; no adventitious sounds. Weight 3 st. 4 lb. The temperature, which on admission was 100°F, remained irregular until September, ranging commonly from 97·4° to 102°F, though at times up to 104°F. A fair amount of thick yellow pus was discharging through the sinuses, and at first the abdomen was dressed daily with a dry sterile dressing.

A blood-count on April 4 showed 1,630,000 red cells per c.mm.; Hb 40%; colour-index 1·2; white cells 11,500 per c.mm. (polymorphs 66%, lymphocytes 33%, monocytes 1%).

TREATMENT AND PROGRESS

April 4. Course of deep X-ray therapy to upper anterior abdomen was begun. The factors comprised kV 190, mA 6, filter of 0·5 mm. Cu, focus skin distance 40 cm., size of field 10 × 8 cm. At first each treatment consisted of 75r, later raised to 100r. Potassium iodide was also given, beginning with gr. 5 t.d.s. and increased daily till gr. 30 t.d.s. was being taken. (At no time were any signs of iodism detected.) *April 8.* Course of sulphathiazole begun. *April 9.* Transfusion of a pint of carefully grouped and cross-matched blood. No reaction. *April 14.* Course of sulphathiazole (30 g.) completed. No change in condition. *April 15.* Passed 26 oz. fresh blood per rectum. Hb 30%. Blood-transfusion (1 pint). *April 16.* Passed 20 oz. fresh blood per rectum. Hb 48%. Blood-transfusion (½ pint). *April 17.* Sensitivity of the actinomyces to penicillin shown to be equal to that of the Oxford staphylococcus. *April 18.* Intramuscular injections of penicillin 60,000 units three hourly begun. *April 26.* Less pain in liver region, with diminution of discharge. General condition improved.

May 3. Blood-transfusion (1 pint). *May 5.* Pain over liver more severe. Temperature swinging widely. Sinuses probed, and 12 ml. of pus aspirated. *May 7.* Penicillin reduced to 60,000 units five-hourly. *May 9.* Blood taken at 12 noon (three hours after injection) contained two inhibiting levels, at 1 P.M. (four hours after injection) two inhibiting levels, and at 2 P.M. (five hours after injection) one inhibiting level. *May 15.* Penicillin increased to 180,000 units five-hourly. *May 16.* Examination of pus from sinuses showed that no penicillin was present one hour after injection. *May 20.* Course of deep X-ray therapy finished. Eleven treatments had been given twice weekly except for an interval from April 15 to April 25, when none was given. The first six treatments consisted of 75r per treatment, the last five of 100r, making a total of 950r to the liver. Potassium iodide increased to gr. 30 four-hourly. *May 21.* Penicillin increased by substituting 500,000 units intravenously for one of the intramuscular doses each day. *May 22.* Intramuscular injections of penicillin increased to 200,000 units, the same intravenous dose of 500,000 units daily being maintained. Pus contained 3–4 units of penicillin per ml. Hb 38%. *May 23.* Blood-transfusion (1 pint). *May 24.* Sinuses aspirated under anæsthesia and 45 ml. of thick yellowish pus removed. Penicillin 800,000 units injected into sinuses. *May 27.* Daily intravenous dose of penicillin increased to 1,000,000 units, the intramuscular injections of 200,000 units being maintained. *May 28.* Patient felt better. Penicillin discontinued, 26,820,000 units having been given. Course of actinomycosis vaccine started (0·1 ml. weekly for four weeks).

June 2. Severe epistaxis. 'Hæmoplastin' 2 ml. given intramuscularly and vitamin K ('Synkavit') 10 mg. b.d. *June 6.* Prothrombin-time 30 sec. Prothrombin index 93 sec. Takata-Ara moderate positive (0++). Alkaline phosphatase 35 units per 100 ml. plasma. *June 7.* Severe abdominal pain; abscess palpable. *June 8.* Abscess incised and 10 ml. pus removed. Considerable hæmorrhage. Cavity plugged with thymol 10% in oil. A few hours later there was further bleeding and the child became very collapsed. Blood, plasma, and saline, 1 pint each, were given. *June 9.* Condition slightly improved. Put on daily thymol dressings. *June 12.* Much improved. No abdominal pain and discharge less. *June 17.* Severe epistaxis. Nose plugged with adrenaline gauze, and hæmoplastin 2 ml. given intramuscularly. *June 24.* Severe abdominal pain. Temperature still raised and swinging. Hb 40%. *June 28.* Blood-transfusion (1 pint).

July 4. Hb 36%. *July 5.* Blood-transfusion (1½ pints). *July 12.* Blood-transfusion (1 pint). Jaundice developed, lasting 24 hours. Dressing changed to 2% 'Phenoxetol.' Second course of deep X-ray therapy started. *July 25.* Hb 36%. Blood-transfusion (1 pint of ordinary blood plus ½ pint of concentrated blood). *July 29.* A further course of intramuscular penicillin 1,000,000 units daily begun. Dressing changed to penicillin 100,000 units per ml.

Aug. 3. As epistaxis appeared to come from septal vessels, 30 mg. radium tube was inserted into left nostril for two hours. *Aug. 6.* Penicillin discontinued, 9,000,000 units having been given. *Aug. 8.* Epistaxis from right nostril. *Aug. 9.* Second course of deep X rays finished. This had comprised eight treatments, each of 100r, the factors being the same as previously. Direct film of pus showed debris and numerous pus cells but no organisms. *Aug. 16.* Feels much better. Discharge now only slight. *Aug. 19.* Direct film of pus again showed no organisms. Culture, aerobic and anaerobic, sterile after seven days. *Aug. 28.* Hb 38%. Blood-transfusion (1 pint). *Aug. 29.* Radium tube, 30 mg., inserted into right nostril for two hours.

Sept. 6. Hb 56%. Discharge ceased. *Sept. 15.* Patient much better and cheerful. Sinuses almost healed. Two cultures negative for actinomyces. Temperature normal for first time. Allowed to sit out in pram. *Sept. 19.* Hb 56%. Sinuses healed. Beginning to walk. *Sept. 24.* Temperature now normal nine days.

Oct. 4. Takata-Ara moderate positive (0++). Alkaline phosphatase 90 units per 100 ml. plasma. Liver extract, 1 tablespoonful of proteolysed liver by mouth daily and 'Examen' 1 ml. weekly by intramuscular injection begun. *Oct. 7.* General condition still improving. Hb 56%. Weight 3 st. 3¾ lb. All treatments except liver discontinued. *Oct. 14.* Up most of the day. *Oct. 21.* General condition very good and walking quite well. Hb 64%.

Nov. 18. Hb 72%. Weight 4 st. Takata-Ara moderate positive (0++). Alkaline phosphatase 70 units. Serum-albumin 4·8 g. per 100 ml.; serum-globulin 6·2 g.

Dec. 2. Takata-Ara moderate positive (0++). Alkaline phosphatase 70 units. Thymol turbidity test 10 units (normal 0–4). Serum-albumin 4·8 g. per 100 ml.; serum-globulin 5·2 g.

Jan. 6, 1947. Liver much less enlarged. Hb 72%. Weight 4 st. 6 lb. Takata-Ara negative. Alkaline phosphatase 50 units. Thymol turbidity test 7 units. Serum-albumin 5·2 g. per 100 ml.; serum-globulin 4·8 g. *Jan. 11.* Patient discharged from hospital.

Feb. 10. Enlarged veins on chest much less prominent. Liver almost normal in size. Hb 78%. Weight 4 st. 7½ lb. Takata-Ara moderate positive (0++). Alkaline phosphatase 50 units. Thymol turbidity test 3·0 units. Serum-albumin 5·6 g. per 100 ml.; serum-globulin 3·0 g.

March 24. General condition excellent. Back at school. Hb 98%. Weight 4 st. 13½ lb. Takata-Ara moderate positive (0++). Alkaline phosphatase 70 units. Thymol turbidity test 2·0 units. Serum-albumin 5·2 g. per 100 ml.; serum-globulin 2·3 g.

DISCUSSION

The numerous remedies that have been advocated in the treatment of actinomycosis can be divided into surgery, medical treatment, and radiotherapy.

Surgical Treatment

This comprises either complete excision, which can occasionally be performed, or establishment of free drainage. Dorling (1944) recommends, in addition to free

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drainage, local oxygenation of the opened tracks by packing with a freshly made suspension of zinc peroxide as advocated by Meleney and Johnson (1937).

Medical Treatment

(1) Bevan (1905), besides irrigating the sinuses with 1% solution of *copper sulphate*, gave the salt by mouth in doses of gr. 1/4, gr. 1/2, or gr. 1 t.d.s. He observed some good results, but these have not been reproduced by other workers.

(2) Myers (1937) obtained recovery in patients treated with 10–20% *thymol* applied locally to the sinuses in olive-oil solution and given by mouth on an empty stomach.

(3) *Iodine* in massive doses is the time-honoured remedy. Though it rapidly cures woody tongue in animals, its value in human actinomycosis is less well established; but it probably helps to promote recovery in some cases. Many writers advocate special forms of iodine, such as tincture of iodine (French Codex), now known as liquor iodi simplex, in milk or cream, 'Collosol' iodine, or Lugol's solution; but it is doubtful whether these have any advantage over potassium iodide. Macnab (1945) recommends that if iodism (lacrimation, salivation, and expectoration) appears the dose should be rapidly increased; if there is no response in a few days, it should then be abandoned, because the effect on the human actinomycotic lesion appears to be very slight.

(4) Colebrook (1921) found that, with adequate surgical drainage, *vaccine* therapy brought rapid improvement in chronic cases. Both stock and autogenous vaccines have been used.

(5) *Sulphonamides* and *penicillin* have been found highly effective (e.g., Dobson and Cutting 1945). Jacob (1944) suggests that sulphonamides probably act by excluding the secondary infecting organisms (usually *Bacterium coli* and streptococci), thus allowing the body's resistance to overcome the actinomycosis. Cutting and Gebhardt (1941) in in-vitro studies found: (*a*) cultures of *A. israeli* were inhibited to some extent by sulphanilamide in a concentration of 10 mg. per 100 ml.; (*b*) concentrations of 50–100 mg. per 100 ml. checked growth more or less completely; and (*c*) sulphathiazole and sulphadiazine were more effective than sulphanilamide in similar concentration. Dorling (1944) recommends that three courses each of 30 g. should be given, with a week's interval between each course. Penicillin, locally or systemically, is often efficacious, but the in-vitro penicillin sensitivity of the organism varies greatly, and MacGregor (1945) points out that it should be tested.

(6) General measures, such as nourishing diet, blood-transfusion when necessary, and efficient nursing must not be neglected.

Radiotherapy

This is valuable. Though radium or deep X rays can both be used, X rays are to be preferred for practical reasons. Smaller doses are given in abdominal actinomycosis than are customarily used in the cervicofacial type, and the field is confined as far as possible to the site of the lesion. If infection becomes acute, the doses are reduced or the treatment is interrupted (Stokkeland 1943).

SUMMARY

A boy aged 9, with a two months' history of abdominal pain following appendicectomy, was found at laparotomy to have actinomycosis of the liver. Within six months an abscess developed in the abdominal wall, with discharging sinuses. He had local and systemic treatment with penicillin, but on admission a year after the laparotomy his condition was grave, with fever, anæmia, abdominal distension, and dyspnœa. Under intensive treatment, chiefly with X rays, penicillin, sulphathiazole, and potassium iodide supplemented by blood-transfusion and vaccine therapy, recovery took place during the next nine months.

I wish to thank Prof. B. W. Windeyer for his constant interest and advice, Dr. R. Pearson for the numerous pathological investigations, and Sister Yandle for the devoted nursing of the patient.

REFERENCES

Bevan, A. D. (1905) *Ann. Surg.* **41**, 640.
Bollinger, O. (1877) *Zbl. med. Wiss.* **15**, 481.
Chitty, H. (1944) *Brit. med. J.* **1**, 115.
Colebrook, L. (1921) *Lancet*, **1**, 893.
Cope, Z. (1938) Actinomycosis. London.
Cutting, W. C., Gebhardt, L. P. (1941) *Science*, **94**, 568.
Dobson, L., Cutting, W. C. (1945) *J. Amer. med. Ass.* **128**, 856.
Dorling, G. C. (1944) *Med. Pr.* **212**, 358.
Emmons, C. W. (1935) *Puerto Rico J. publ. Hlth*, **11**, 63.
Israel, J. (1885) Klinischa Beiträge zur Kenntniss der Aktinomykose des Menschen. Berlin.
Jacob, F. H. (1944) *Brit. med. J.* **1**, 266.
Lord, F. T. (1933) *Med. Clin. N. Amer.* **16**, 829.
MacGregor, A. B. (1945) *Proc. R. Soc. Med.* **38**, 639.
Macnab, G. H. (1945) *Edinb. med. J.* **52**, 219.
Meleney, F. L., Johnson, B. A. (1937) *Surg. Gynec. Obstet.* **64**, 387.
Myers, H. B. (1937) *J. Amer. med. Ass.* **108**, 1874.
Naeslund, C. (1925) *Acta path. microbiol. scand.* **2**, 110.
Ponfick, E. (1882) Die Actinomykose des Menschen. Berlin.
Stokkeland, E. (1943) *Acta radiol., Stockh.* suppl. 50.
von Baracz, R. (1902) *Arch. klin. Chir.* **68**, 1050.

RESULTS OF SYMPATHECTOMY OF THE UPPER LIMB

WITH SPECIAL REFERENCE TO RAYNAUD'S DISEASE

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CONFLICTING reports have appeared recently on the results of sympathectomy of the upper limb. Paterson Ross (1946) has stated that the sympathetic denervation following a well-planned and correctly executed operation is permanent. Kuntz et al. (1938) and Kirgis and Kuntz (1942), on the basis of animal experiments, consider that sympathetic fibres may reach the arm via the white rami in the anterior roots of the eighth cervical and first thoracic spinal nerves, and that, as these remain intact, sympathectomy of the hand may be incomplete. Simmons and Sheehan (1939) and Haxton (1947a) have demonstrated the return of vasomotor and sudomotor reactions in many sympathectomised limbs and have attributed this to regeneration of the sympathetic fibres.

We describe here some further observations on the results of upper-limb sympathectomy.

The 56 limbs studied were those of persons who had undergone sympathectomy for Raynaud's disease (44), Raynaud's phenomenon (8), thrombo-angiitis obliterans (2), causalgia (1), and trophic ulcer (1). The interval between operation and investigation varied from a month to six years.

All the sympathectomies were preganglionic sections. Fig. 1 shows the scope of the operation, which was

CLINICAL RESULTS OF SYMPATHECTOMY IN 52 HANDS SYMPATHECTOMISED FOR ATTACKS OF RAYNAUD'S DISEASE OR THE RAYNAUD PHENOMENON

Interval between operation and investigation	No. of hands	History of vasospastic attacks since operation			Patient's reply to: "was operation worth while?"		Interval between operation and first attacks (months)		
		None	Less often and less painful	Same as before	Yes	No	Less than 1	3–6	More than 12
1–6 months	16	14	2	—	16	—	2	—	—
1–6 years	36	18	14	4	32	4	5	9	4

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similar to that described by Smithwick (1940). The anterior and posterior roots of the second intercostal nerve were usually severed intradurally, and a piece of the nerve at least 1 inch long was resected. The third intercostal nerve was resected in like manner. The sympathetic chain was cut between the third and fourth thoracic ganglia, and the distal end, with attached second and third sympathetic ganglia, was turned upwards and stitched to the muscle. The objects of these measures were (1) section of all sympathetic fibres to the limb, and (2) prevention of regeneration by leaving as wide a gap as possible between the cut ends of the chain and by dividing the spinal roots intradurally so that the dura should heal over and imprison the central ends of the cut fibres.

The following questionnaire was sent to patients operated on for Raynaud's disease or Raynaud's phenomenon, worded so as to obtain evidence of as objective a character as possible about the effect of the operation on the vasospastic attacks:

(1) Was the operation worth while? Put "yes" or "no."
(2) Have there been any attacks of "white or dead fingers" or of "blue fingers" since the operation? Put "yes" or "no."
(3) If "yes," how long was it between the operation and the first attack?
(4) If "yes," have the attacks been more frequent, less frequent, or as frequent as before the operation? Put "more," "less," or "same."
(5) If "yes," have the attacks been more severe, less severe, or as severe as before the operation? Put "more," "less," or "same."

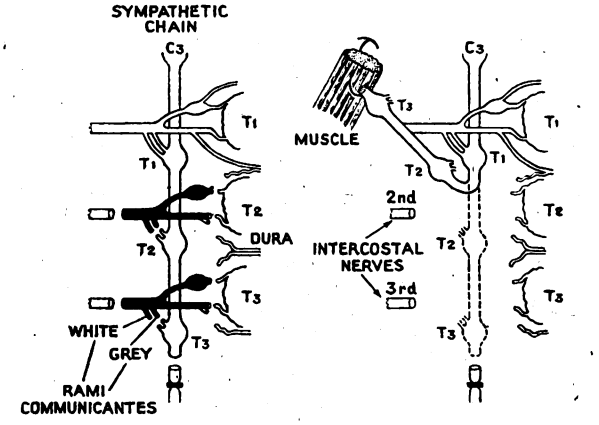

Fig. 1—Stages in sympathectomy of upper limb by preganglionic section.

TESTS FOR SYMPATHETIC FIBRES TO THE HAND

Vasomotor Test.—The principle of this test is that warming the feet elicits a reflex increase in the blood-flow in the hands via the vasomotor centre and sympathetic nervous system (Landis and Gibbon 1933). In the absence of sympathetic fibres to the limb, heating or cooling the feet has no effect on the blood-flow in the hands. The test was carried out as follows:

Room temperature was usually 17–19°C. The patient sat on a couch with his back supported. His arms rested on cushions on tables on either side, with the elbows bent and the hands at or slightly above heart level. A plethysmograph was fitted to each hand (Barcroft and Edholm 1945) and filled with water at 32°C. The outside of the plethysmograph was warmed at short intervals with a small gas flame to keep the water temperature constant. The water inside was mixed by means of a rubber-spray bulb fitted to a side tube. The blood-flow in the hands was recorded at intervals of 5 min. throughout the test. A preliminary control period of half an hour was followed by an hour's heating (fig. 2). Both feet were immersed to above the ankles in water at 45°C, and the patient was covered with two blankets.

Sudomotor Test.—The principle of this test is that the resistance to the passage of an electric current through the body is almost entirely in the skin and is determined mainly by the activity of the sweat glands. This in its turn depends on nervous excitation mediated by the sympathetic (Richter 1946). Fig. 3 is a diagram of the test circuit.

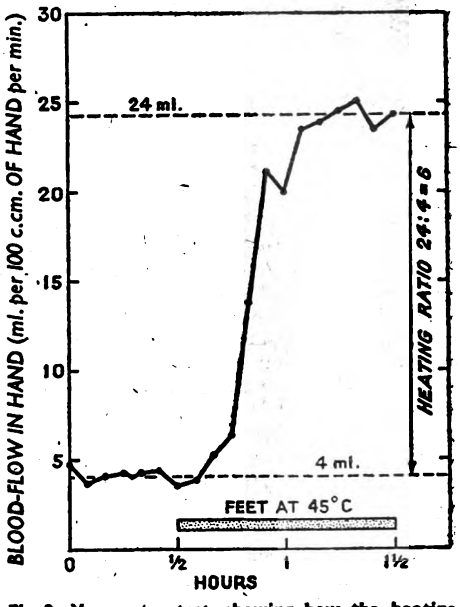

Fig. 2—Vasomotor test, showing how the heating ratio was obtained.

One pole of a 4·5 volt battery was connected to an indifferent electrode, which was covered with a pad well moistened with saline and placed in the axilla. The other pole was connected through a micro-ammeter to a brass applicator of about 1 cm. in diameter with an insulated handle. The current through the skin over the terminal pulp spaces of the thumbs, the middle fingers, and the little fingers was measured at intervals of 5 min. Care was taken that the fingers did not touch each other. The applicator was dried between each reading.

After a control period of half an hour the patient was covered with two blankets, and both feet were immersed in water at 45°C to induce maximal activity of the sweat glands in the pads of the thumbs and middle fingers (test skin); and both ulnar nerves were blocked with 4% procaine containing 1 in 50,000 adrenaline to paralyse the sweat glands in the little fingers (control skin). Readings were continued at intervals of 5 min. for an hour (fig. 4).

RESULTS

Vasospastic Attacks.—Before operation, in almost all hands affected by the Raynaud phenomenon, there were vasospastic attacks of such frequency and severity as to make these people miserable. The condition after operation was very different (see table): in 18 out of 36 hands operated on from one to six years before, there had been no recurrence of attacks; in 14 hands attacks had recurred but were much less disabling; and in only 4 hands had no benefit been obtained.

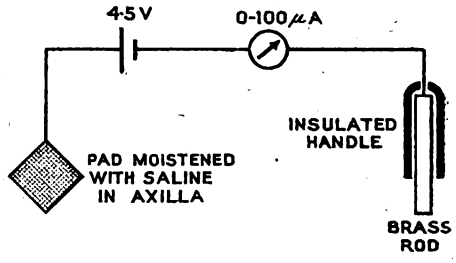

Fig. 3—Apparatus used for investigation of skin resistance.

An interesting fact shown in the table is that if the attacks recurred after operation they usually did so in from three to six months. In only 4 hands was the time of the first recurrence more than a year after operation.

Vasomotor Test.—The results of each test were plotted as in fig. 2, which shows how the figures for the heating ratio were obtained. Note that, if the blood-flow had remained unaltered during heating, the ratio would have been 1.

The heating ratios for some normal hands and for the sympathectomised hands are shown in fig. 5. Vaso-

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dilatation took place during indirect heating in all the normal hands, the flow being increased three or more times.

The results for the sympathectomised limbs (fig. 5) are arranged in order of the time interval between operation and testing, beginning on the left. All hands tested within six months of operation had heating ratios of about 1—i.e., indirect heating had no effect on the vessels in the hand. No tests were done on hands from six months to a year after operation. In contrast to the early results many hands tested from one to six years after operation had ratios considerably greater than 1—i.e., in these cases heating of the feet elicited vasodilatation in the hand.

Sudomotor Test.—The results of each test were plotted as in fig. 4, which shows how the value of the current difference between the test and control skin areas was obtained. Note that in the absence of the sympathetic supply the test skin would not have sweated, and the current difference would have been 0.

The current differences of some normal hands and for the sympathectomised hands are shown in fig. 5. In all the normals there were large current differences due to the low resistance of the moist test skin and the relatively larger resistance of the dry control skin. The results for the sympathectomised hands are arranged, as before, in order of time interval between operation and testing and vertically below the vasomotor results for the corresponding hands. Here again they fall into two groups—those obtained when the test was carried out within six months of operation; and those when it was done from one to six years after. All hands tested within six months had very small current differences. In many others, however, the differences were quite large, indirect heating having excited the sweating reflex.

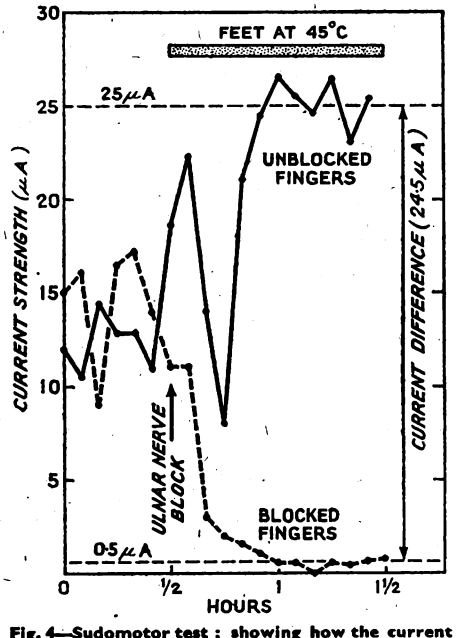

Fig. 4—Sudomotor test; showing how the current difference was obtained.

Fig. 5 shows conclusively that there was no evidence of any sympathetic nervous connexion between the brain and the hand for several months after sympathectomy. However, a year or more after operation vasomotor and sudomotor reflexes were often present.

DISCUSSION

The absence of vasomotor and sudomotor reflexes for several months after operation proves that preganglionic section completely sympathectomises the hand. It follows that:

1. The anterior roots of the eighth cervical and first thoracic spinal nerves, which are not cut, do not transmit sympathetic fibres to the hand. Nor do the auxiliary ganglia described by Skoog (1947).

2. The posterior roots of the spinal nerves of the brachial plexus are not concerned in the vasomotor reflex.

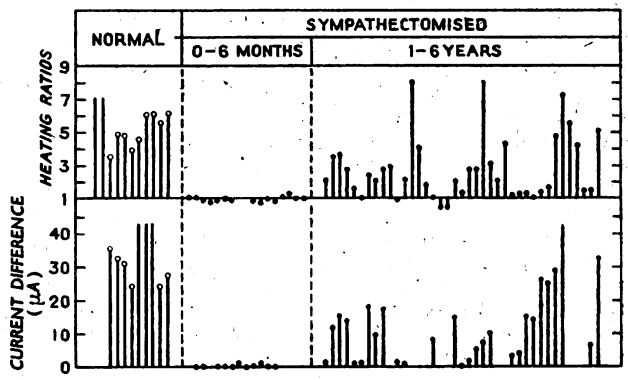

Fig. 5—Results of vasomotor test obtained in normal and in sympathectomised hands.

The return of the reflexes many months after operation signifies the re-establishment of nervous connexions with centres in the brain. This confirms the findings of Simmons and Sheehan (1939) and of Haxton (1947a). From the point of view of function, however, the new nerve path appears to be less efficient. The evidence for this is derived from findings in the 36 hands sympathectomised for vasospasm and tested from one to six years after operation. The table shows that in 18 hands the attacks had ceased altogether; in 14 they were much less painful and occurred less frequently; in only 4 was no benefit obtained. Yet fig. 6 shows the existence of a nervous connexion between the brain and the blood-vessels of the hand in a considerable number of "cured" hands. The explanation of this appears to be that the new nerve path is less efficient than the original, with the result that the constrictor tone which it mediates is insufficient to precipitate attacks of vasospasm either by itself or when combined with a "local fault" in the blood-vessels of the hand (Lewis 1946).

Not much information about the efficiency of the re-established connexions can be obtained from the tests. The postoperative heating ratios are not strictly comparable with those of the normal hands, since arterial disease, which introduces a complicating factor, was present in many of the sympathectomised hands. Differences in the composition of the sweat and in the distribution of the sweat glands may render the skin-resistance test unreliable as a quantitative test.

The question arises whether the new nerve path explains the recurrence of vasospastic attacks in hands which show a return of symptoms after operation. The recurrence of attacks soon after sympathectomy in the 7 hands shown in the table is probably due entirely to a "local fault" in the blood-vessels of the hand such as has been postulated by Lewis (1946), since reflex sympathetic activity was absent in all hands tested within six months of operation. In 9 hands attacks of vasospasm first recurred from three to six months after operation. Similar "late relapses" have been described by Simmons and Sheehan (1939), who found that ulnar-nerve block raised the skin temperature of the fingers, and concluded that regeneration was the cause.

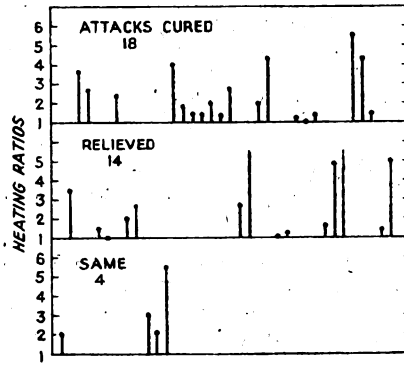

Fig. 6—Clinical results and heating ratios of hands investigated 1-6 years after sympathectomy for vasospastic attacks.

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Our own observations, which are admittedly rather few, showed absence of reflexes for at least six months after sympathectomy (4 limbs tested after a month; 5 after two months; 3 after three months; 1 after four months; and 4 after six months). Results of further work on the reappearance of the attacks and of the reflexes would be interesting.

We have not obtained any experimental evidence of the whereabouts of the new nerve path. It is difficult to imagine that the new connexions to the sweat glands are not sympathetic. And if the sympathetic can re-establish a path to the sweat glands it can probably also do so to the blood-vessels. Assuming the new path to be sympathetic two possible routes are: (1) through anterior roots above the second thoracic spinal nerve; and (2) by regeneration of fibres from the lower cut end of the sympathetic chain above the fourth thoracic ganglion or from the central cut ends of the second and third anterior spinal roots.

The possibility that the return of sympathetic reflex activity after operation is due to rearrangement of the outflow at a higher level has been suggested by Ray et al. (1943). They found that some return of sympathetic function took place within ten weeks of section of all the anterior roots containing a sympathetic outflow to the upper limbs. This time interval was so short that they considered regeneration was improbable.

The remarkable powers of regeneration of sympathetic fibres are the subject of an extensive literature, which has been reviewed by Lee (1929), Sheehan (1941), and White and Smithwick (1941).

An experiment of Lee's (1930) is worth careful consideration. He cut a cat's cervical sympathetic and fixed the ends so that they were separated by an inch of muscle. After 275 days, stimulation of the proximal end excited the typical retraction of the nictitating membrane and enlargement of the pupil. Stimulation of the tissue between the nerve ends showed that the regenerated fibres had taken a course partly through the muscle and partly round it. Histological sections confirmed that regeneration had occurred.

In man regeneration of sympathetic fibres is the likely explanation for return of sympathetic functions, as has been shown by Haxton (1947a). In cases where an upper-limb sympathectomy had been performed and where return of sympathetic function had taken place (as shown by skin-resistance tests), paravertebral injection of procaine below the level of the first thoracic sympathetic ganglion could again produce complete sympathetic paralysis in the upper limb, and this without the production of a Horner's sign. The injections did not cause any disturbance of sensation or of motor power in the upper limb. These findings strongly suggest sympathetic regeneration. More recently Haxton (1947b) has reported the result of a necropsy in a patient who had had a cervicodorsal ganglionectomy fifteen years before death. He found that sympathetic fibres had regenerated, with the result that the sympathetic chain was uninterrupted in the cervicodorsal region and that rami communicantes could be demonstrated in this region running to the lower spinal nerves of the brachial plexus.

In conclusion, it remains to point out a curious fact shown in fig. 5—in some hands the sudomotor reflex was present but the vasomotor reflex absent. The explanation of this is unknown.

SUMMARY

Examination of 17 upper limbs from one to six months after sympathectomy (preganglionic section) showed:

1. Well-marked clinical improvement. No recurrence of attacks in 14 out of 16 hands operated on for Raynaud's phenomenon; in 2 hands the attacks were less frequent and less severe.

2. Absence of vasomotor and sudomotor reflexes.

3. Therefore preganglionic section completely sympathectomises the limb; there is no outflow to the hand above the second thoracic anterior spinal nerve-root.

Examination of a further 39 upper limbs from one to six years after preganglionic section showed:

1. Well-marked clinical improvement. No recurrence of vasospastic attacks in 18 out of 36 limbs operated on for Raynaud's phenomenon. In 14 hands the attacks were much less distressing; in only 4 had no benefit been obtained.

2. Vasomotor and sudomotor reflexes, though absent in some limbs, were present in many.

3. It follows that a nervous connexion between the brain and the vessels and sweat glands of the hands is often re-established.

The persistence of the excellent clinical results in spite of the re-establishment of a vasomotor path probably signifies that the new path is functionally inferior to the original. Partial regeneration is the most likely explanation of the new nerve path.

We are most grateful to Prof. J. R. Learmonth for advice and facilities at Edinburgh; Mr. P. Fitzgerald and Mr. J. S. Loughridge for putting us in touch with their patients; Prof. J. M. O'Connor for facilities at University College, Dublin; Dr. W. J. Allen, Dr. C. C. Burt, Mr. H. A. Haxton, and Dr. R. L. Richards for advice and assistance; Mr. D. B. Smith for technical assistance; and the Medical Research Council for defraying expenses.

REFERENCES

Barcroft, H., Edholm, O. G. (1945) *J. Physiol.* **104**, 161.
Haxton, H. A. (1947a) *Brit. J. Surg.* **35**, 69.
— (1947b) *Lancet*, ii, 598.
Kirgis, H. D., Kuntz, A. (1942) *Arch. Surg., Chicago*, **44**, 95.
Kuntz, A., Alexander, W. F., Furcolo, C. L. (1938) *Ann. Surg.* **107**, 25.
Landis, E. M., Gibbon, J. H. jun. (1933) *Arch. intern. Med.* **52**, 785.
Lee, F. C. (1929) *Physiol. Rev.* **9**, 575.
— (1930) *Res. Publ. Ass. nerv. ment. Dis.* **9**, 417.
Lewis, T. (1946) Vascular Disorders of the Limbs. London.
Ray, B. S., Hinsey, J. C., Geohegan, W. A. (1943) *Ann. Surg.* **118**, 647.
Richter, C. P. (1946) *J. Neurosurg.* **3**, 181.
Ross, J. P. (1946) *Brit. med. J.* i, 1.
Sheehan, D. (1941) *Annu. Rev. Physiol.* **3**, 399.
Simmons, H. T., Sheehan, D. (1939) *Brit. J. Surg.* **27**, 234.
Skoog, T. (1947) *Lancet*, ii, 457.
Smithwick, R. H. (1940) *Ann. Surg.* **112**, 1085.
White, J. C., Smithwick, R. H. (1941) The Autonomic Nervous System. London.

ELECTRONARCOSIS

ITS VALUE AND ITS DANGERS

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ELECTRONARCOSIS has now been used for some years in America and for rather more than a year in Britain for the treatment of mental disorder, especially schizophrenia. The technique has been described in detail by Paterson and Milligan (1947). Tietz et al. (1945) found that, of 47 patients, 19 made grade-A recoveries and 17 made social adjustments. They concluded that the therapeutic results approximated to those obtained with insulin shock, and they reaffirmed this conclusion in a later paper (Tietz et al. 1946). Tietz (1947) reported the results of 710 treatments given to 46 patients, including 18 schizophrenics, of whom 14 made grade-A recoveries. These cases appear to have been of fairly recent onset. Paterson and Milligan (1947), reporting results in 20 cases of schizophrenia, ill for various periods but all "definitely hallucinated," were more cautious in their claims. Nevertheless they described their results as most promising, stated that in all cases the hallucinations disappeared, and considered that in some cases the degree of recovery was most striking. It may be thought that these workers take an unduly pessimistic view of the

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difficulties and dangers of insulin treatment, but all would agree with the importance they attach to any treatment which might more conveniently, more speedily, or more effectively combat this dreadful disease.

As with all physical treatments, the question of complications and dangers is important, and in this respect the published reports are reassuring. Tietz et al. (1945) had given over 1000 treatments without any fatality or significant complications. Paterson and Milligan (1947) spoke of the "simplicity and relative safety" of the treatment, and mentioned no particular difficulties in their series.

Our own series is small, though of the same order as those reported by other workers. We have treated 28 patients, of whom 21 were schizophrenics, with a total of 271 treatments. We publish them now in the belief that the remarkable uniformity of results obviates the need for large numbers; and because we have failed to confirm the findings of the American workers. We cannot agree either that the treatment is effective or that it is safe. It is hoped that soon the experiences of others may be published so that the issue may be clarified.

RESULTS

The 7 patients who were not schizophrenics may be disposed of at once. They included 2 with chronic mania, neither of whom made any improvement, and 5 with depression. Of the latter, 3 refused treatment after two or three sessions, and 2 recovered. We did not form the impression that the recovered patients made better or quicker recoveries than they would have done with ordinary electroconvulsive therapy.

The schizophrenic group we have divided for convenience into two classes, which we describe as schizophrenia and paraphrenia, meaning by the latter an older group of patients with good personality preservation, a better façade, less obvious thought disorder, and better affective preservation.

We will consider the schizophrenic group of 11 patients first. Of these, 4 were recent cases with a history of less than a year and 2 of them had full courses of electronarcosis. In the remaining 2 cases electronarcosis was stopped after a few treatments because of circulatory collapse. None of the 4 showed any improvement. The remaining 7 cases were of some standing, on the average two or three years, and of these 1 refused treatment at an early stage, 1 developed hæmoptysis, 2 showed circulatory collapse, and 3 had full courses without the slightest benefit.

The paraphrenias included 6 recent cases: 1 patient refused treatment; in 1 case electronarcosis was abandoned because of severe confusion; 2 patients had full courses without any benefit; and 2 had full courses and improved somewhat but subsequently relapsed. The case-record of 1 of these last 2 follows.

A single woman, aged 23, was admitted to hospital on Aug. 12, 1947. Her family history was normal, and she had a good work record and a previous personality which showed no outstanding morbid features. For some months she had been depressed, and had come to believe that others were preventing her from effecting a liaison with a neighbouring farmer. She felt that her attachment to this man, which he had never shown any sign of reciprocating, was becoming known to more and more people. She observed that most of the daily newspapers were referring to it in a concealed way, and that the matter was being broadcast by the B.B.C. She felt that he was making great efforts to establish contact with her, and she often heard his voice calling her to come to him.

At the time of her admission this hallucinosis had become intense and almost continuous. She was given a full course of electronarcosis and undeniably improved; her depression disappeared, and she showed what, from a superficial point of view, might be regarded as some insight into her illness. She spoke of her previous delusions in a rather cold intellectual way; yet it was quite clear from her conversation that she still hankered after the imagined lover. Her conversation was imperfectly integrated, and she continually implied that the examiner need not question her, for he could read her mind.

She was discharged on Sept. 24 at the request of her relations, but subsequently relapsed and was readmitted on Dec. 10 in very much the same condition as before. She said her lover was concealed in the hospital, and that there was a widespread plot to keep him from her. On this occasion she was given a short course of electroconvulsive therapy and again her behaviour improved, but she still gave signs of thought disorder. Her condition at present is excellent as regards behaviour, but she is undoubtedly still ill.

Comment.—This woman was of good personality, with an illness which appeared to have developed recently, and it is certain that electronarcosis gave her no greater benefit than electroconvulsive therapy would have done. In fact, on readmission electroconvulsive therapy alone had the same (and the usual) effect—namely, an improvement in behaviour without any substantial change in the fundamental thought disorder. It is common experience that schizophrenics often settle down within a few days of admission to hospital, behave better, and often deny hallucinosis, even without treatment. Nevertheless small environmental changes will produce behaviour disorder again, and there is all the difference in the world between quiescence of this kind and true recovery.

COMPLICATIONS

Three types of complications were encountered. A sharp hæmoptysis developed in 1 case, and treatment was promptly stopped. Neither radiography nor examination by a tuberculosis expert has since shown any sign of physical disease. The second complication was severe clouding of consciousness, which in 2 patients, aged 38 and 44 years, lasted for many days; there was no indication in either of these cases of precedent cerebral arteriopathy. Psychometric tests were given to all the patients before and after treatment, and these included the Wechsler-Bellevue, the Herring revision of the Binet-Simon, the Rorschach, and various simple memory tests. The second testing was given after all clouding of consciousness had disappeared. In no case was any substantial change noted. Failure to discover signs of deterioration psychometrically does not reassure us, and there may be some grounds for concern about the possibility of permanent cerebral damage.

The third, and most important, complication was collapse. This occurred in 7 cases, and in only 2 of these did we feel able to continue to face the risk, despite our anxiety to give the therapy a reasonable test. Some of these patients collapsed several times before the treatment was abandoned. The condition is similar to that of traumatic shock—namely, a peripheral circulatory failure. The patient is still, with greyish-blue and cold skin; the pulse is imperceptible, and the heart-rate rapid, and breathing is long, sighing, and infrequent. It seems to us at least possible that the subsequent confusion is related to cerebral anoxia due to the continued pooling of blood in the periphery rather than to any direct action of the electric current on the brain.

DISCUSSION

It is not suggested that electronarcosis does less than electroconvulsive therapy, but we have found little evidence that it does any more. The case-record given above shows the type of remission obtainable in paraphrenia by either means—an improvement in behaviour which falls short of recovery and is not sustained. It seems unlikely that electronarcosis will take the place of insulin therapy in the treatment of young schizophrenics. We have followed the procedure and technique described by other workers, and it seems that, even if the results of electronarcosis were as good as those obtained with insulin, as Tietz has maintained, the risk is so much greater that electronarcosis would still be a highly undesirable alternative treatment.

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SUMMARY

The results of treatment with electronarcosis in 28 cases, including 21 of schizophrenia, are outlined.

In no case of schizophrenia was any lasting improvement obtained; and in all but 2 not even transitory improvement was obtained.

We find little evidence that electronarcosis has contributed to the physical therapy of the psychoses.

The dangers inherent in the treatment appear to be considerable.

We have pleasure in thanking Dr. R. E. Hemphill, medical superintendent, Bristol Mental Hospital, for permission to publish this paper and for his interest; and our colleagues, Dr. K. C. P. Smith, Dr. J. R. Hawkings, Dr. L. B. Thomas, and Dr. J. R. Stuart, who have shared in the investigation.

REFERENCES

Paterson, A. S., Milligan, W. L. (1947) *Lancet*, ii, 198.
Tietz, E. B. (1947) *J. nerv. ment. Dis.* 106, 150.
— Thompson, G. N., van Harreveld, A., Wiersma, C. A. G. (1945) *Amer. J. Psychiat.* 101, 821.
— — — — (1946) *J. nerv. ment. Dis.* 103, 144.

FRUCTOSE AND FRUCTOLYSIS IN SEMEN IN RELATION TO FERTILITY

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THE metabolism and consequently the survival of spermatozoa within ejaculated semen depend largely on the supply of nutrient material to the spermatozoa by the seminal plasma.

It has been known for many years that the nutrient substance present in the seminal plasma is a reducing and glycolysable carbohydrate, and that the rate of glycolysis in semen is correlated so strictly with the density and motility of spermatozoa that it can be used as a basis for a truly quantitative evaluation of sperm.[1 2 4 7–11 16 21 22 27] For a long time, however, the nature of the glycolysable carbohydrate remained unknown, and it is only comparatively recently that chemical investigations have shown that the seminal sugar is *d*-fructose (lævulose).[12–14] Fructose exists normally in the seminal plasma of various mammals, including man, ram, bull, boar, stallion, rabbit, rat, and guineapig, and is formed and secreted regularly in the male accessory glands, chiefly the seminal vesicles, but also, in some species, in the ampulla of the vas deferens and in certain parts of the prostate.[12–14] The formation of fructose in the accessory organs is initiated, maintained, and strictly controlled by the testicular hormone, and characteristic fluctuations in the level of seminal fructose can be evoked by treatment with testosterone.[15] In young growing males fructose appears in the secretory fluids of the accessory glands before the onset of active spermatogenesis in the testes; hence when at puberty the first motile spermatozoa appear in the generative tract, the fructose reserve is ready to be utilised.[3]

The identification of fructose as the seminal sugar and the demonstration that this substance is the sole physiological substrate for the formation of lactic acid in semen[14] made it possible to discard the old criteria for measuring the glycolytic activity of spermatozoa, such as shift of pH, increase in lactic-acid content, and decrease in the "reducing sugar" value, and to develop a new and more satisfactory method based on the measurement of fructose and fructolysis in whole semen by a simple colorimetric procedure involving the reaction with resorcinol.[20]

In connexion with this reaction, it must be remembered that none of the substances which produce colour reactions with fructose, such as resorcinol,[23] diphenylamine,[5] naphthol,[18] cryogenine,[28] and various indole derivatives,[6 19 24 25] can be regarded as specific for fructose, since they give positive results not only with fructose but also with other substances, such as the Neuberg ester, Harden-Young ester, sucrose, methylglyoxal, dihydroxy-acetone, and numerous other ketose derivatives.[14 17] Therefore it would have been unjustifiable to claim that fructose can be estimated in semen colorimetrically unless chemical proof was forthcoming that the seminal compound responsible for the colour reaction is fructose.

However, in the case of semen we have satisfied ourselves beforehand that the colour reaction used for the assay of fructose is strictly specific for this sugar alone. Proof to that effect was furnished when it was shown that (1) fructose occurs in the semen in a free form and accounts for the whole of the yeast-fermentable material which yields the colour reaction; (2) fructose can be purified from semen and identified by its reducing value, specific optical activity, and the preparation of methylphenyl-fructosazone; and (3) there is practically no glucose in semen and no other substance which would yield the same colour reaction as fructose.[12–14]

When fresh semen alone is incubated, in vitro, the fructose disappears rapidly at first, but later, owing to the fall in pH, more slowly or not at all. However, with the addition of a suitable quantity of phosphate buffer, fructolysis can be maintained at a steady rate for several hours, and under such conditions the disappearance of fructose follows a linear course until practically the entire sugar content is exhausted. Fig. 1 illustrates the course of fructolysis in buffered and unbuffered semen of the bull.

METHOD

The method of measuring fructose and fructolysis in semen is essentially the same for all species, provided that the semen samples to be analysed contain sufficient fructose to be detectable by the colour reaction. The quantity of fructose present in 100 ml. of semen may vary from a few mg. in the boar and the stallion to several hundred mg. in man, the ram, and the rabbit, and may be as high as 1000 mg. in the bull. In the bull, a fact which is of special interest in view of the importance of artificial insemination in cattle, 0·4 ml. of semen is sufficient for the complete assay of both fructose and fructolysis.

0·4 ml. of freshly ejaculated bull semen of known density is pipetted into a narrow glass tube not more than 0·7 cm. in diameter, followed by 0·2 ml. of 0·25 M-phosphate buffer, pH 7·4. 0·1 ml. of the mixture is withdrawn and deproteinised immediately and the remainder incubated at 35–37°C, and from the incubated mixture 0·1 ml. samples are withdrawn and deproteinised hourly for three hours. In the absence of

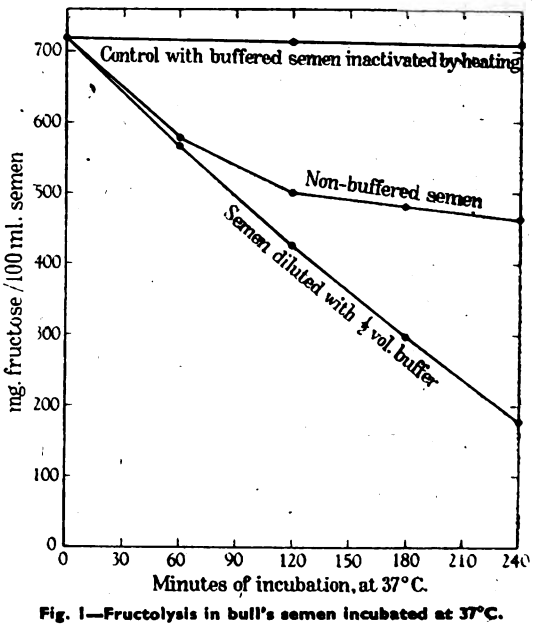

Fig. 1—Fructolysis in bull's semen incubated at 37°C.

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a proper incubator, the incubation tube can be inserted into a perforated cork disc and fitted into the upper portion of a thermos flask of good quality filled with warm water. The deproteinisation is carried out in test-tubes by diluting 0·1 ml. of the semen-buffer mixture with 1·9 ml. of water, followed by the addition of 1 ml. of 2% zinc sulphate ($ZnSO_4.7H_2O$) and 1 ml. of 0·1 *N* NaOH. The mixtures are then heated for 1 min. in boiling water and filtered, and 2 ml. amounts of the clear filtrate are measured into test-tubes marked 0^h, 1^h, 2^h, and 3^h.

Meanwhile standard solutions for the colorimetric assay are made from freshly prepared 0·2% aqueous solution of Kerfoot's "pure lævulose." For this purpose a series of four test-tubes is set up, marked A, B, C, and D. Tube A receives 1·8 ml. of water, tubes B, C, and D 1 ml. each. Then 0·2 ml. of 0·2% sol. of fructose is pipetted into tube A, mixed, and 1 ml. of this mixture transferred to B. From there 1 ml. of the mixed contents is transferred to C, and again from C to D. Next, 1 ml. of the mixed contents of D is discarded, so that finally the four tubes A, B, C, and D contain 1 ml. fluid each, representing 0·2 mg., 0·1 mg., 0·05 mg., and 0·025 mg. fructose respectively. To each of the four standard dilutions are then added 0·5 ml. of 2% zinc sulphate and 0·5 ml. of 0·1 *N* NaOH, and the contents thus brought to 2 ml.—i.e., the same as with the semen filtrates.

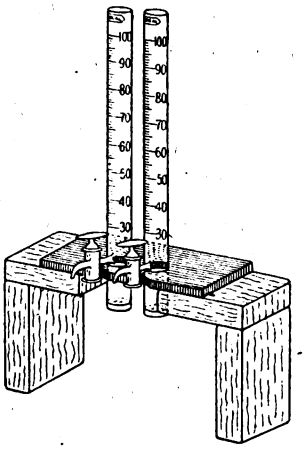

Fig. 2—Wolff colorimeter made from two glass cylinders, with sealed glass bottoms and small-outlet taps, mounted on a wooden stand.

To each sample 2 ml. of 0·1% alcoholic solution of resorcinol and 6 ml. of 30% HCl (5 parts of concentrated and analytically pure HCl + 1 part of water) are added, the mixtures are heated 10 min. in water at 80–85°C, and, after cooling, the colorimetric determination is carried out. A Wolff colorimeter, which is particularly suitable for this purpose, can easily be constructed from two graduated 'Ogal' glass cylinders, with sealed glass bottoms and small-outlet taps, mounted on a wooden stand (fig. 2). If these are not available, simple graduated Nessler tubes 1 cm. in diameter can be used. The concentration of seminal fructose, in terms of mg. fructose per 100 ml. of semen, is obtained by multiplying the quantity of fructose (in mg.) found in 2 ml. of filtrate (equal to 0·033 ml. of semen) by 3000.

RESULTS

The results obtained with this method can briefly be summarised as follows:

(1) The level of fructose in fresh semen depends chiefly on the secretory function of male accessory organs of reproduction, which in turn is determined and regulated by the activity of the testicular hormone. A low level of seminal fructose (below 350 mg. per 100 ml. of semen in the bull) may coincide with other symptoms of hormonal malfunction, low quality of spermatozoa, or necrospermy. On the other hand, a high level of seminal fructose indicates a high functional ability of accessory glands but does not necessarily coincide with high quality of spermatozoa as expressed in their density and motility. Azoospermic semen, for instance, as produced by vasectomised animals, usually has a very high fructose content (600–1000 mg. per 100 ml. of semen in the bull), and semen of low density from subfertile animals may often contain a normal amount of fructose (above 400 mg. per 100 ml. in the bull).

(2) The level of fructose in fresh semen undergoes frequent fluctuations, which can be observed if semen is collected from the same individual at different times. A second ejaculate soon after the first often contains fewer spermatozoa but a higher concentration of fructose. Perhaps the best illustration of the extent of fluctuations in the sperm/fructose ratio is provided by subjecting an animal to an "exhaustion test"[26]—i.e., numerous samples of semen collected from a single animal at very short intervals are analysed. In a bull subjected to this test 8 ejaculates were obtained within 63 minutes. The first ejaculate was 4·2 ml., with 7·6 μg. fructose and 1,664,000 spermatozoa per μl.; the last of the series was 2·9 ml., with 6·9 μg. fructose but only 98,000 spermatozoa per μl.

(3) The seminal vesicles are the chief producers of seminal fructose, and therefore the chemical determination of fructose in fresh semen of certain species can indicate the relative contribution made by the seminal vesicles to the whole semen. However, this can only be an approximate guide, because other organs may also contribute fructose. In both the bull and the ram fructose is also found in the ampullæ. In the rabbit it is found both in the vesicular gland and in the ampullæ as well as in the prostate. In the rat fructose is contained in the coagulating gland and in the dorsal prostate but not in the seminal vesicle proper. On the other hand, in the dog, which has neither a seminal vesicle nor a structure that would correspond to this gland, only a trace of fructose was found in the semen.

(4) Fructose disappears from semen incubated in vitro, and the rate of fructolysis, as assessed by the colorimetric assay of disappearing fructose, forms a simple and convenient measure of the metabolic activity of spermatozoa. The normal rate of fructolysis in bull's semen is 1·4–2 mg. of fructose utilised per 10^9 sperm cells in 1 hour at 37°C, and at that level it can be maintained in buffered semen until almost the whole reserve of fructose has been exhausted by breakdown to lactic acid. Azoospermic and necrospermic semen cannot utilise fructose. A reduced rate of fructolysis is found in spermatozoa of low motility from subfertile or infertile animals.

(5) Fructolysis plays an essential rôle in the survival of spermatozoa. Under storage conditions in vitro, as used in the practice of artificial insemination, the survival depends to a large extent on fructolysis and not on respiration. An abnormally short period of survival usually coincides with the presence in semen of low-quality spermatozoa in spite of a plentiful supply of fructose by the seminal plasma. Occasionally, however, the survival may be short as a result of an insufficient quantity and rapid exhaustion of the fructose content in semen. The conditions of sperm survival in semen incubated in a narrow tube, as used for fructolysis, are almost purely anaerobic. However, even if the semen is incubated under aerobic conditions, fructolysis plays an essential though not exclusive rôle in sperm survival. Aerobically both fructose and lactic acid act by maintaining the rate of oxidative reactions and by prolonging the respiration of spermatozoa.

SUMMARY

The survival of spermatozoa in ejaculated semen depends largely on the amount of fructose in the seminal plasma.

The formation and secretion of fructose in the male accessory sexual glands is controlled by testicular hormone.

The amount of fructose present in semen can be measured colorimetrically. A method of doing this is described.

A low semen-fructose level suggests either hormonal or spermatozoal deficiency; but a high semen-fructose level does not necessarily indicate spermatozoal efficiency. The level is normally subject to fluctuation.

Fructose disappears from semen incubated in vitro; the rate of fructolysis indicates the amount of spermatozoal metabolic activity. Fructolysis plays an essential

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part in the survival of stored spermatozoa, as used in artificial insemination.

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REFERENCES

1. Anderson, J. (1946) *J. agric. Sci.* **36**, 260.
2. Comstock, R. E. (1939) *J. exp. Zool.* **81**, 147.
3. Davies, D. V., Mann, T. (1947) *Nature, Lond.* **160**, 295.
4. Huggins, C., Scott, W. W., Heinen, J. H. (1942) *Amer. J. Physiol.* **136**, 467.
5. Ihl, A. (1885) *Chemikerztg.* **9**, 451.
6. Jordan, R. C., Pryde, J. (1938) *Biochem. J.* **32**, 279.
7. Laing, J. A. (1944) *J. agric. Sci.* **35**, 1.
8. MacLeod, J. (1941) *Amer. J. Physiol.* **132**, 193.
9. Mann, T. (1945a) *Nature, Lond.* **156**, 80.
10. — (1945b) *Biochem. J.* **39**, 451.
11. — (1945c) *Ibid*, p. 458.
12. — (1946a) *Nature, Lond.* **157**, 79.
13. — (1946b) *Biochem. J.* **40**, xxix.
14. — (1946c) *Ibid*, p. 481.
15. — Parsons, U. (1947) *Nature, Lond.* **160**, 294.
16. Moore, B. H., Mayer, D. T. (1941) *Res. Bull. Univ. Mo.* no. 338.
17. Neuberg, C., Mandl, I. (1946) *Arch. Biochem.* **11**, 451.
18. Pinoff, E. (1905) *Ber. dtsch. chem. Ges.* **38**, 3308.
19. Pryde, J. (1946) *Nature, Lond.* **157**, 660.
20. Roe, J. H. (1934) *J. biol. Chem.* **107**, 15.
21. Salisbury, G. W., VanDemark, N. L. (1945) *Amer. J. Physiol.* **143**, 692.
22. — (1946) in T. Engle's Problem of Fertility. New York.
23. Sellwanoff, T. (1887) *Ber. dtsch. chem. Ges.* **1**, 181.
24. Thomas, P., Maftei, E. (1926) *Bull. Soc. Stiinte Chy.* **3**, 41.
25. — — (1927) *Chem. Zbl.* **98**, 779.
26. Walton, A., Edwards, J. (1938) *Proc. Amer. Soc. Animal Prod.* 31st Annual Meeting; p. 254.
27. Webster, W. M. (1939) *Proc. Sheep Farmers, Massey Agric. Coll., N.Z.* 8th Annual Meeting.
28. Yamada, K. (1933) *Jap. J. med. Sci.* II, **2**, 93, 245.

Reviews of Books

Rhumatisme articulaire aigu

R. LUTEMBACHER, cardio-rheumatological centre, Seine et Oise. Paris: Masson. 1947. Pp. 430. Frs. 1000.

IN spite of its title, this is not a book about joint disease but is a treatise on the visceral manifestations of rheumatic fever and their treatment with intravenous salicylates, based upon the author's wide experience in this field. After a full account of rheumatic carditis, he gives a description of rheumatic disease of the lungs which he considers an important cause of death in children. The chapters on rheumatic hepatitis and pancreatitis are particularly noteworthy, and he makes much use of a galactose-tolerance test and other biochemical investigations in studying this problem. The action of the liver on salicylates and of salicylates on the liver is fully discussed. Dr. Lutembacher's views are illustrated by excellent photomicrographs of the various visceral lesions, and by an impressive profusion of case-reports. The proof of the rheumatic origin of these lesions depends largely on their response to intravenous salicylates, which he claims to be a specific and reliable remedy, if used correctly. Although most readers will not agree with all he claims, his book is interesting and rich in personal observations.

Pathological Histology

(3rd ed.) ROBERTSON F. OGILVIE, M.D., F.R.C.P.E., lecturer in pathology, University of Edinburgh. Edinburgh: E. & S. Livingstone. 1947. Pp. 459. 37*s.* 6*d.*

TODAY this volume is specially valuable: the 260 illustrations (photomicrographs in colour) bring the laboratory to the study table, and the volume takes the place of the class slides and of the microscope so difficult to obtain. When teachers are dealing with increasing numbers in large classes, individual demonstration is not always possible. Here, in the fields selected for illustration, the "unit lesion" of each condition is clearly shown, often with low-power and high-power views, and the accompanying text is comprehensive. In this new edition a few new plates have been added and some are distinctly better than their predecessors. Other plates are less bright than in the previous edition. To make the volume even more useful, even at the risk of increasing the price, we would suggest the inclusion of a small number of normal half-fields for comparison—for example, in those figures illustrating (for the first time) necrosis; a few more low-power companions would be welcome, and so would plates showing ulcer-cancer and ulcerating cancer of the stomach in addition to chronic peptic ulcer. These last three should be at × 5 or × 7 diameters, and the plate large enough to show, more clearly than does the present chronic gastric ulcer figure, the special features of these conditions.

Headache

L. G. MOENCH, M.D., assistant clinical professor of medicine. University of Utah School of Medicine. Chicago: Year Book Publishers. London: H. K. Lewis. 1947. Pp. 207, 19*s.* 6*d.*

UNTIL recently headaches have been taken for granted as part of the total span of normal experience. There is now increasing interest in the mechanisms responsible for pain in the head and their causes, largely because of Dr. Harold Wolff's work. This little monograph, written for the general practitioner, is largely based on this work, of which it gives a lucid and accurate account. On pain of more obscure origin, such as the facial neuralgias, pains due to cervical disorders, or pains of emotional origin, it is less helpful; but in providing an introduction to recent work on headache it usefully fulfils its author's intention.

Mongolism and Cretinism

C. E. BENDA, M.D., director, Wallace research laboratory for study of mental deficiency, Wrentham, Mass. London: W. Heinemann. 1947. Pp. 310. 25*s.*

THE condition named "mongolism" by Langdon Down in 1866 is still a challenge to the pathologist. Dr. Benda is among those who have studied it intensively, both from the clinical and the pathological viewpoints, and his results are now presented in a well-produced book. A number of new points in the pathological anatomy are brought to light—such as retardation of development in the spinal cord—and these are supplemented by tables of measurements at different ages. Much emphasis is placed on the findings in the pituitary gland, where Dr. Benda believes the primary abnormality to be situated. He points out that the thyroid gland is always abnormal in mongolism and shows atrophic changes and colloid goitre, which could be secondary to pituitary dysfunction. He contrasts this with the aplastic thyroid in cretinism, a condition which, throughout the book, he compares and contrasts with mongolism, pointing out in the preface that in early times the two diseases were hopelessly confused with one another.

In the full discussion of biochemical tests, Bixby's careful work is fully quoted. Deviations from the normal are frequently found in mongolism, but there are no consistent or characteristic biochemical anomalies. Possible ætiological factors concerned with maternal health are discussed in a large series of cases. No genetic analysis of the data is attempted, although one family containing three affected sibs is recorded and another with two. Dr. Benda's monograph is a welcome addition to published work on an interesting and important subject, but it does not throw much new light on the cause of this common dysplasia.

Diseases of the Nose, Throat and Ear (9th ed. London: H. Kimpton. 1947. Pp. 993. 63*s.*).—Prof. Howard Charles Ballenger, assisted by Dr. John Jacob Ballenger, has thoroughly revised the new edition of Prof. William Lincoln Ballenger's well-known textbook, and has added a new chapter on headaches, and neuralgias of the face and head. The steps in rhinoplastic reconstruction are described and illustrated; and the contributors on special subjects have revised their sections.

Atlas of Dental Histology (Oxford: Blackwell Scientific Publications. 1947. Pp. 49. 12*s.* 6*d.*).—This useful book has little text but many excellent photomicrographs. Mr. E. B. Manley and Mr. E. B. Brain have described only the best methods and techniques, omitting those which are out of date or indifferent. For the reader without special dental knowledge a diagram alongside the plates, showing from which particular area of the tooth each section was taken, would be useful.

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THE LANCET
LONDON: SATURDAY, MARCH 20, 1948

Incentives of the Specialist

PLANNING the organisation of a society, or of a profession within a society, must be a weight on the conscience. When either is allowed just to grow, its faults are those of nature; nobody is to blame. But if it is planned and goes wrong, it was the planner's fault. When, as so often happens, the planner is mostly concerned with correcting the errors of the old régime, he is apt to introduce his new order without anticipating the new errors it may involve. Now that planning has become the inescapable order of the day, those responsible should give special heed to the good features of the old order which they incidentally disturb. Among these are the conditions that elicit from men their best effort.

The existing organisation of medicine embodies a variety of incentives to which doctors respond with more or better work. The incentives of the specialist, not necessarily in their order of importance, are these: to make a living, preferably a good living; to be outstanding in the eyes of the public, and of the profession, as an expert in one branch of medicine; to have the satisfaction of varied and interesting work, well done; to enjoy, in the peculiarly medical human relationship, the trust and gratitude of patients; to add something to medical knowledge, and to gain esteem thereby; and to pass on, by teaching or example, something of value to the next generation. No specialist responds to one incentive only; neither love of gain nor love of the work is one man's whole motive, though either may predominate. Most are impelled by several motives, in varying proportions. Moreover, the system requires nearly everyone to strive in individual competition with his fellows—for money, for opportunity, for prestige, or for esteem. The new régime, so far as we can picture it, will alter the pattern of those incentives, and change the circumstances of the competition. The money prizes will be smaller, and prestige built on financial success will be less. How far can we standardise the material rewards without losing in quantity and quality of effort? For the present generation of doctors—general practitioners or specialists—it is clear that the financial incentive is an important one. They repudiate a full-time salaried service; and though the ground at present emphasised is that such a service may impair professional freedom, the ground that reward should be related to effort is openly and properly recognised. If the new service comes too near to levelling remuneration, the new generation of doctors, self-selected, will be people relatively immune to the direct financial stimulus. Will they nearly all be people who do good work for the love of it, or will too many of them be mediocre security-seekers? It would be only caution, not cynicism, to leave in the new system a fair element of increased reward for good performance and better effort. The established specialists of today may not need it, for their private consulting practice will dwindle only slowly; but it will be required for some of those who follow. If the hospital work as done today is to be paid by salary, the range should be fairly wide, and there is a good case for preserving the fee-for-service basis for domiciliary consultations.

Apart from money, the specialist, like other doctors, needs a position in which he can do the work he likes best and is best fitted for. This means variety. Full-time specialist appointments in hospitals can be more stimulating and attractive than would have been admitted ten or twenty years ago. As will be seen from Dr. AVERY JONES's lecture published on another page, describing the scope and interest of full-time specialism as developed under the Middlesex County Council, it offers opportunity enough in many directions. Though it takes the edge off the keenness of individual competition and requires a willingness to collaborate and work in teams, it leaves many of the specialist's incentives unimpaired. The new service would do well to offer many such full-time appointments, wherever possible letting people choose whether they will work as part-time specialists, retaining private practice, or as full-time specialists; and in the case of full-time specialists whether they wish to confine their work to hospitals, or to undertake domiciliary consultation as well. Salaries should be adjusted accordingly. It might go even further in offering variety of opportunity, by allowing part-time specialists to conduct their private consulting practice from rooms in the hospital, just as the Act allows them to treat private patients in special blocks of the hospital. Abuse of such a system could be prevented by a rule, like that obtaining at Harvard, which limits the consultant's total fees from this source to a stated amount—e.g., an amount not higher than the salary he receives for his hospital work. By this device the service could secure, from those who are not attracted by a full-time hospital appointment, a large and willing contribution to the work of the hospital, which would no longer conflict with an overriding interest in private practice.

There is another advantage in associating younger specialists, of all tastes, as closely as possible with the hospital: it gives everyone the chance to undertake research if he wishes. Research is an uncertain pursuit. It attracts more often than it rewards. Young men embark on it with high hopes; but only a few, making it their career, achieve enough to afford satisfaction throughout their lives. Many more, having learned much themselves and contributed a trifle to the sum of knowledge, turn gladly to clinical work, teaching, or administration as their main justification. Other young men, because of its uncertainties or because of its financial insecurity, hesitate to embark on research at all, or turn from it too quickly to practice in order to make their living. Since originality combined with ability is rare, the hospital system should encourage every possible owner of them to engage in some form of research, without prejudice to his ultimate career should he not achieve outstanding success, and with prospect of further opportunity if he should. Variety with elasticity in the terms of hospital appointments will do this. It will also avoid the segregation of too many researchers and would-be researchers in special institutes, whereby both they and the clinicians left behind in the

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hospital suffer. And it will help to break down the wall of suspicious antagonism between academic and non-academic clinicians that has unfortunately grown up over the years in too many of our medical schools.

Clubbed Fingers

CLUBBING of the fingers (and toes) was first reported by HIPPOCRATES [1] in a case of empyema but received little attention until the papers of MARIE [2] and VON BAMBERGER [3] appeared towards the end of last century. Though now familiar to clinicians, its causation has remained obscure in spite of the fact that MENDLOWITZ [4] could consult more than 300 references for his extensive review of the subject in 1942. The association of symmetrical clubbing with intrathoracic suppuration, congenital heart disease with cyanosis, and subacute bacterial endocarditis is well recognised. However, it has also been noted in practically every form of chest disease, especially carcinoma of the lung, when it may appear early and before there is any evidence of secondary infection; in abdominal conditions, most of which are associated with chronic diarrhœa, especially steatorrhœa; in disorders of the liver, especially the relatively uncommon biliary cirrhosis and amyloid disease; and occasionally in a whole host of other conditions which need not be enumerated. It is not a constant finding in any of these states. Occasionally it is hereditary, when it apparently has no pathological significance. Unilateral clubbing may accompany some local conditions, such as aneurysm of the aorta or of a great vessel on the same side. It is fairly easy to see how this could interfere with the blood-supply or nerve-supply to the extremity and the exact explanation might provide a clue to symmetrical clubbing. Since this symmetrical clubbing is found in such a diversity of apparently unrelated clinical conditions it seems reasonable to suppose there must be some common peripheral mechanism. But, though there have been plenty of theories and much argument, so far no general agreement on the pathogenesis has been reached.

It used to be thought that clubbing depended on anoxæmia. This would be understandable in, for example, cyanotic heart disease but less so in steatorrhœa. Moreover, there is no decrease in the oxygen saturation of the blood in many of the cases. Nor is clubbing seen in severe anæmia or peripheral vascular disease, or for that matter in chronic congestive cardiac failure. MENDLOWITZ [5] showed that an increased peripheral blood-flow could be demonstrated in all the cases of clubbing that he studied, and in his view this is the cause of the tissue overgrowth which is the fundamental pathological change in clubbing. This sounds reasonable, for WILKINS et al.[6] and also GRANT and PEARSON [7] previously showed that the finger-tips normally have a peculiarly rich blood-supply, and, working with a plethysmograph, they demonstrated that when peripheral vasodilatation is produced by warming the body there is an unexpected pressure gradient. The blood-flow is greater in the terminal phalanx than in the middle one, greater in the finger than in the hand, and greater in the hand than in the forearm. MAUER [8] has recently revised the anoxic theory. He maintains that clubbing is due to local tissue anoxia for which a common basis does exist. He says that patients with clubbing have a raised erythrocyte-sedimentation rate (E.S.R.) associated with intravascular rouleaux formation, and that such rouleaux formation will interfere with gaseous exchange. But rouleaux formation would have to be extreme to produce tissue anoxia, and peripheral emboli might be expected; whereas they are not in fact seen. Once more, there is no evidence that clubbing is invariably associated with a high E.S.R., or that a high E.S.R. is always accompanied by in-vivo rouleaux formation. MAUER explains the absence of clubbing in rheumatoid arthritis by the peripheral vasoconstriction, shown by cold finger-tips, and he suggests that the sluggish flow is sufficient to maintain the oxygen tension with low metabolic levels. A similar explanation is applied in Raynaud's and Buerger's diseases, though there is no constant state of vasoconstriction in these conditions. Clubbing certainly does not occur in some conditions in which the E.S.R. is exceptionally high, such as multiple myelomatosis, in which there are no signs of reduced peripheral blood-flow. It may be said, then, that MAUER's views are easy to criticise; but it is not so easy to devise any better theory. Possibly the work of KNISELY [9] on "sludged blood" will ultimately produce the answer.

No precise criteria have been laid down for the diagnosis of clubbing. Mere curving of the nails is not enough. Most of the types described depend not so much on different underlying diseases as on the severity of the process and on variations in the normal configuration of the finger-tips. Sometimes, too, there is a disproportion in the overgrowth of the various tissues. LOVIBOND [10] urged that the earliest sign is filling in of the angle normally present between the proximal end of the nail and the adjacent terminal phalanx. However, in some healthy people this angle may be scarcely recognisable and occasionally it is still present when other signs of early clubbing can be detected. The onset is so gradual that it is rarely first noticed by the patient. Excessive fluctuation may be obtained from accumulation of fluid between the nail base and the nail bed. Trophic changes and a blue discoloration may develop in time and an actual drumstick appearance is a relatively late stage. Finally, periosteal proliferation may occur with characteristic X-ray changes. The process then usually involves bones proximal to the phalanges and may extend to the ends of the long bones of the forearm and leg. This condition is called hypertrophic osteoarthropathy, but it is merely a more advanced stage of clubbing and may arise from any of the same causes. Either condition may wax and wane with the activity of the underlying disease and even disappear with its cure—e.g., drainage of an empyema or treatment of a lung abscess. From the clinical standpoint there will always be differences

1. Hippocrates. Prognostic No. 17. Loeb Classical Library, 1923, vol. II, 25. (Quoted by Mendlowitz.)
2. Marie, P. *Rev. Med.* 1890, **10**, 1.
3. Von Bamberger, E. *Z. klin. Med.* 1891, **18**, 193.
4. Mendlowitz, M. *Medicine, Baltimore*, 1942, **21**, 269.
5. Mendlowitz, M. *J. clin. Invest.* 1941, **20**, 113.
6. Wilkins, R. W., Doupe, J., Newman, H. W. *Clin. Sci.* 1938, **3**, 403.
7. Grant, R. T., Pearson, R. S. B. *Ibid*, p. 119.
8. Mauer, E. F. *Amer. Heart J.* 1947, **34**, 852.
9. Knisely, M. H., Bloch, E. H., Eliot, T. S. *Science*, 1947, **106**, 431; see leading article, *Lancet*, Jan. 3, p. 26.
10. Lovibond, J. L. *Lancet*, 1938, **1**, 363.

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of opinion about the presence of early clubbing and on how far the wide range of normal should extend.

MENDLOWITZ suggests that the theory of over-nutrition from increased peripheral blood-flow will form the corner-stone of future hypotheses. This may be true: but the mechanism of the increased blood-flow in the various clinical disorders associated with clubbing remains obscure. There is no need for longer lists of diseases in which clubbing has been noted but rather for further observations with the plethysmograph and experiments designed to reveal whether these diverse disorders set up some nervous or chemical stimulus to the blood-supply, and if so by what means.

Malnutrition and Cirrhosis

SEVERE malnutrition is disturbingly widespread in the dark-skinned races of tropical Africa, whose staple diet of maize meal is augmented irregularly with vegetables and fermented whole (cow's) milk and rarely with meat. Hepatic cirrhosis and primary hepatic carcinoma are relatively common in these peoples, and a completely normal liver is rare at any age among them. Children from 7 months to 4 years are mainly affected with the prevalent form of malnutrition, and it carries a high mortality in Uganda. The typical clinical picture is a nutritional diarrhœa, with bulky soft stools containing much undigested food, and a deficiency bowel-pattern seen radiologically. Nutritional œdema with decreased plasma-albumin and increased plasma-globulin is present; and there is anæmia, with pellagra-like lesions and depigmentation of the skin and hair. The condition may be primary, or secondary to some infection; adults are also affected; and it may be acute or chronic. It has been called "kwashiorkor," [1] "infantile pellagra," [2] and "malignant malnutrition." [3] The GILLMANS, [4 5] who have studied what seems to be the same disease in South Africa, have produced comparable lesions in rats maintained on a similar diet.

The pathology of malignant malnutrition was described in our issue of Feb. 28 (p. 317) by J. N. P. DAVIES, who suggests that, in the primary condition, having regard to the steatorrhœa and failure to digest meat and starch, the essential disorder is malnutritional and pancreatic, while the more obvious hepatic enlargement, with fatty infiltration early and cirrhosis later, is secondary. The late and final results are hepatic cirrhosis, pancreatic fibrosis, and a form of nephritis; and death may be from any one of these. From studies on liver-biopsy and necropsy material it seems that the acute disease progresses from fatty infiltration (peripheral to mid-lobular and centrolobular), with peripheral pericellular fibrosis, to monolobular cirrhosis. The fatty change regresses with treatment and with time, often without clinical improvement. As the patient gets older the cirrhosis may become more severe or may remain stationary—a hall-mark of malignant malnutrition which future attacks may accentuate. These features recall the experimental cirrhosis induced by protracted exhibition of diets deficient in lipotropic factors. In malignant malnutrition the pancreas shows progressive atrophy of acini due to hyaline cellular change and general diffuse fibrosis: in advanced cases the fibrosis is very severe, acinar loss is considerable or complete, and the islet cells, embedded in dense fibrous tissue, are reduced also. Pancreatic fibrosis was noted in two-thirds of 165 routine necropsies and in all of 13 recent cases of malignant malnutrition, whatever the patient's age. "Proliferative glomerulitis," [6] with renal glomerular hyalinisation and pericapsular fibrosis, was noted in 11 of the 20 cases examined. The disease is not always progressive; unknown factors vary the rate of its course, and sometimes under treatment (to which it is very refractory), or apparently spontaneously, clinical improvement occurs, heralded (in the Uganda cases) by a swelling of the submaxillary and parotid glands, and attended by resumption of pancreatic function, the stools soon showing that all the food is digested.

The novel idea of DAVIES regarding the primary rôle of the pancreas in this condition was suggested to him first by the known fact that depancreatised dogs kept alive with diet and insulin develop fatty infiltration of the liver; and secondly, by his observation of diabetic and hyperglycæmic coma in malignant malnutrition. In the white races partial or total pancreatectomy is only rarely followed by hepatic cirrhosis, [7] but the diet of these patients is usually adequate, whereas the gross nutritional disorders of African natives are associated with multiple deficiencies and these might determine the onset of primary hepatic insufficiency and fibrosis; but this finds no parallel in any of the extensive animal experiments in dietary deficiency.

In their further observations on malignant malnutrition in Uganda, HOLMES and TROWELL reported last week (p. 395) evidence of failure on the part of the liver cells to store glycogen, even after intravenous glucose. This work is preliminary to more comprehensive and detailed studies. The patients examined were selected clinically, their ages ranged from 2 to 40 years, and all were wasted, œdematous (gross anasarca in some), and anæmic; with 3 exceptions the malnutrition was uncomplicated save occasionally by latent malaria and ankylostomiasis. The test dose of glucose was 50 g. (except in an infant) dissolved in a pint of water, sterilised, and run into a vein as quickly as possible. Blood-sugar estimations were made, and in liver-biopsy material (30–60 mg.) glucose was estimated by a modified Hagedorn and Jensen method. All the controls (inpatients with no obvious defect of nutrition) and 1 patient who recovered showed an increase in liver glycogen of 10–100% (e.g., 13 to 26 mg. per g.) after 2 hours, whereas of the malnutrition cases all but 1 showed a fall in liver glycogen after glucose (e.g., from 11·9 to 10·9 mg. per g.). The blood-sugar curves showed diminished glucose-tolerance in malnutrition cases. Glucose-tolerance curves in 2 young children with severe clinical malnutrition showed absence of definite defect in glucose absorption after glucose given by mouth. HOLMES and TROWELL conclude that while in malignant malnutrition the liver cells are still capable of mobilising and synthesising glycogen they appear to be unable to store glycogen even from abundant blood glucose. These studies, as their authors say, "offer endless opportunities for speculation about the nature of the failure."

1. Williams, C. D. *Arch. Dis. Childh.* 1933, **8**, 423.
2. Trowell, H. C. *Ibid*, 1937, **12**, 193.
3. Trowell, H. C. *Clin. Proc.* 1944, **3**, 381.
4. Gillman, J., Gillman, T. *Lancet*, Jan. 31, p. 169.
5. Gillman, J., Gillman, T., Mandelstam, J., Gilbert, C. *Brit. J. exp. Path.* 1945, **26**, 67.
6. Hennessey, R. S. F. *E. Afr. med. J.* 1938, **15**, 329.
7. Weir, J. F. *J. Amer. med. Ass.* 1947, **134**, 579.

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Annotations

AMENDMENT

Two days before the British Medical Association's representative meeting opened on Wednesday, the *Times* published a special correspondent's suggestions on how the Government might "regain the confidence of ordinary doctors, which it has plainly lost for the time being." He thinks that the amending Bill needed to remove the ambiguity about the validity of partnership agreements after July 5 should be enlarged, in the first place, to include three pledges recently given by Mr. Bevan and his colleagues: (1) that the service will respect doctors' freedom of speech and writing; (2) that it will not impose a "closed shop" on doctors or other health workers; and (3) that the executive councils will, after the initial appointments, choose their own chairmen. In addition, since the Minister has promised that local authorities will be pressed to coöpt local doctors and others to their health committees, the Bill might well require them to do so.

The *Times* correspondent then goes on to make the more radical proposal that the Medical Practices Committee should take over a number of "invidious duties" now resting on the Minister: for example, it might negotiate with practitioners on the method of their remuneration (whether by basic salary or capitation fees or otherwise); it might settle local disputes arising over succession to partnerships; it might hear appeals from tribunals by practitioners objecting to dismissal from the service; and it might nominate the two members of the tribunal who are not nominated by the Lord Chancellor. The committee (which is to consist of a medical chairman and eight other members, of whom six are to be doctors and at least five actively in practice) is a vestigial remnant of the Central Medical Board which in the Coalition scheme was to preside over general practice; and the *Times* correspondent would like to see it regain the status which the board enjoyed as a corporate body complementary to the Central Health Services Council. Unfortunately the B.M.A. always objected to the board on the ground that it would really be little more than a department of the Ministry; and certainly it is not at all easy to see the present Minister giving a mainly professional body full authority to settle with the rest of the profession so vexed a question as the basic salary. Nor has Mr. Bevan so far shown any positive disposition to adopt another of the correspondent's suggestions and leave such matters to decision by Whitley Council machinery, which (where there is disagreement) implies arbitration.

The *Times* article ends by referring to the depressing effect of the present abandonment not only of health centres but of local planning for them—a subject to which we shall shortly return. So much, however, can be expected eventually from the hospital side of the Act, that it is only partly true to say that "the new service is hardly worth having unless . . . it steadily promotes the renascence of general practice by improvements in the facilities for, and closer collaboration among, doctors in their daily work."

PACKING THE PHARYNX

THE decision to pack or not to pack the pharynx during a dental extraction is important both legally and clinically. An inhaled tooth leads at worst to a lung abscess and at best to atelectasis; so its consequences are always serious. That subsequent legal proceedings for damages are a possibility, if not a probability, must further stimulate anæsthetists and dental surgeons to take every precaution against this accident.

A pharyngeal pack of gauze or sponge provides an efficient if perhaps not a perfect barrier between the dental forceps and the larynx; yet despite the ease with which it is inserted, and its low cost, its use has opponents. That a pharyngeal pack makes the surgeon less careful of where the teeth fly is an objection that only rebounds against the surgeon; that the pack makes the patient cyanosed implies that the anæsthetist is not doing his job in keeping the airway clear; while if it obscures the operative field this is evidence that it has not been inserted skilfully. Even in those who have obstruction of the nasal passages—and it is surprising how seldom the busy experienced anæsthetist encounters such patients—it is usually possible to arrange a piece of gauze as a curtain between forceps and pharynx without obstructing respiration. In fact none of these objections are adequate reasons for not using a simple and proven safeguard against a serious and occasionally fatal accident. From the medicolegal standpoint it may be undesirable to declare that failure to insert a throat pack during a dental extraction under general anæsthesia constitutes negligence. Nevertheless, it is now considered that in case of accident the onus is on the anæsthetist or surgeon to explain why a pack was not used; and before long (as the secretary of the Medical Protection Society points out[1]) "opinion may be so strongly against a practitioner who fails to pack the fauces that on that score alone he may be held to be negligent."

To prevent inhalation of teeth is a joint responsibility of anæsthetist and surgeon, and both must be vigilant. The former should insert a pharyngeal pack effectively separating the operation area from the pharynx without obstructing respiration, while the latter must keep his eye on the tooth and account at the end of the operation for all teeth and roots extracted.

METALS AND MEN

ESKIMOES are known to treat fractures by means of skewers of whale-bone and thongs of raw hide, and surgeons through the ages have used whatever materials have been at hand for sutures or fixation. During the centuries, in the search for a perfect metallic fixture material for internal use, almost every metallic element has been employed, lauded, and forgotten. Until Lister, failures occurred early and were due to sepsis; and in the post-Listerian period, though these early failures were prevented, other troubles developed later. The human body resented the interloper, or the interloper could not perform its function in the strange human environment. Albin Lambotte, after using many metals in the treatment of fractures, reported in 1909 that, apart from such metals as magnesium, which rapidly dissolved, sepsis was the critical factor in marring his results. In 1927, having overcome the bogy of sepsis, he still reported failures, and suggested the possibility of unfavourable electrolytic dissolution of the bone and the applied metal.

In 1913 Brearley, looking for a rustless steel for British naval guns, discovered the stainless properties of chromium-steel alloys; and as these steels were developed their fresh possibilities attracted surgeons to their use. Among others, William O'Neill Sherman, chief surgeon to the Carnegie Steel Company (and so an indirect benefaction of our Scottish benefactor, Andrew Carnegie), became interested in the design and metallic construction of the plates and screws used by surgeons; and his design of plate was eventually approved and recommended by the fracture committee of the American College of Surgeons. These men all looked for chemically inert metals which would not be affected by the chemicals of tissue fluids, and which, on dissolution, would not harm bone and callus. The "19–9" stainless steel is so far the material most nearly meeting these requirements.

1. Durand, R. W. *Brit. dent. J.* 1947, 83, 8.

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The same committee which approved the Sherman type of plate also approved the Venable plate, and the alloy, 'Vitallium,' of cobalt, chromium, and molybdenum with which it is made. Vitallium was originally made for dental use, being electrolytically inert. A casual talk with a dentist suggested its use to Charles Venable and Walter Stuck, who showed that in animal tissues, chemical solutions, and tissue fluids vitallium produced no electrolytic phenomena. They held electrolytic change to be the cause of the failure of other metals, and they produced and used appliances for internal fixation of fractures made from their new alloy. Many of us know from experience how well human tissues tolerate this alloy, which at present seems to be the most perfect for internal application; and in describing their investigations, findings, and beliefs Venable and Stuck have given a fascinating account of the whole subject of internal fixation.[1]

ANTIDOTE TO CALCIFEROL

CALCIFEROL (vitamin D_2) is now being tried in various forms of tuberculosis besides lupus vulgaris, and it seems likely that the optimal dosage is usually near, if not beyond, the limit of tolerance.[2] An effective antidote which could be applied if toxic effects became alarming would be useful, and Charpy and Pichat[3] claim that the sulphur-containing amino-acid, cysteine, is such an antidote. In their view calciferol works by activating phosphatase, so they sought an antidote among the substances known to inhibit the action of alkaline phosphatase. Both cysteine and glutathione were tried, and both proved effective. They gave large overdoses of calciferol (15·6 million units in 16 days, 24 million units in 25 days, and 51·6 million units in 68 days) to three patients with hopelessly advanced pulmonary tuberculosis and at the same time injected 1 mg. of cysteine daily. In no case was there any change in the blood levels of calcium, cholesterol, or urea, nor were there any characteristic signs of calciferol intoxication; in the one case that came to necropsy, vascular and visceral calcification was absent. Three cases of lupus were then given the normal Charpy dosage of calciferol with cysteine, and in these the cysteine appeared to inhibit both the toxic and the therapeutic effects of calciferol.

In some countries, where calciferol is particularly scarce, a concentrated D_3, which is easier to make, is being used as a substitute for D_2 in lupus therapy. Toxic effects will probably be more severe and more common with D_3 than with D_2, and the need for an antidote may therefore be correspondingly greater.

GENES OF THE CANCER CELL

A LEADING character of every malignant tumour is its uncontrolled growth. The cancer cells multiply with little regard to adjacent structures or to the needs of the body as a whole. Though the cause of this independence is unknown, it is recognised as a permanent feature, and malignant cells are not expected to regain their innocence either spontaneously or with the help of any form of treatment. The permanence of the change has been shown by both clinical observation and experiment. Dr. Albert Fischer maintained cells from Ehrlich's mouse carcinoma in artificial culture for fifteen years, and the successive subcultures kept their malignant character throughout, and grew as mammary carcinomas when injected subcutaneously into healthy mice.[4] Because of this irreversibility, whatever the cellular alteration may be that explains the transition from innocence to malignancy, it is probably associated intimately with the chromosomes. Rørdam[5] suggests that the change in the chromosomal apparatus may be the loss or inefficiency of a particular gene whose function is to coördinate the growth of normal cells with their environment. According to his suggestion the genic constitution of a normal cell might be represented by the formula: (AA, BB, . . . MM, . . . PP, . . .), where M represents the hypothetical coördinating gene. If an incompetent M gene is represented by μ, the formula for a cancerous cell would be: (AA, BB, . . . $\mu\mu$, . . . PP, . . .). Rørdam further surmises that a cell in which only one of the two M genes has been rendered impotent—(AA, BB, . . . Mμ, . . . PP, . . .)—is not a cancer cell, for its growth is still governed by the neighbouring tissues, though the control has become weak. Benign tumours may be examples of this weakness as shown in the formula, and so too may be the precancerous warts which often appear before the epitheliomas induced by artificial carcinogens.

According to this hypothesis a single μ gene would obviously be lethal to the growing ovum, and therefore cancer cannot be transmitted from either of the parents to the offspring, though it is conceivable that a weakness of one or both of the M genes might be inherited by an apparently normal embryo and thereby increase its susceptibility to cancer.

THE SPLEEN IN CONGESTIVE HEART-FAILURE

SPLENOMEGALY in heart disease is generally accepted as practically pathognomonic of subacute bacterial endocarditis. White,[6] for instance, says firmly that splenomegaly "is confirmatory of the diagnosis of subacute bacterial endocarditis." Fishberg[7] is slightly less definite—"Apart from the very exceptional instances in which secondary changes in the liver cause significant obstruction to blood-flow through this organ, it seems doubtful if the spleen is ever sufficiently enlarged to be palpable as a result of uncomplicated heart failure"—while Lewis[8] held that "it is unusual for it [the spleen] to increase much, if at all, as a consequence of heart failure."

American workers[9,10] have sometimes questioned this conventional view, and Fowler[11] has brought forward fresh evidence suggesting that splenomegaly is by no means uncommon in congestive heart-failure. His material was drawn from the post-mortem records of the Peter Bent Brigham Hospital, and consisted of 50 surgical cases used as controls, 50 cases of valvular rheumatic heart disease with congestive failure, 50 cases of hypertensive or arteriosclerotic heart disease, and 46 cases of subacute bacterial endocarditis. Patients under the age of 16 years were excluded from the study, as were those with any other condition commonly associated with splenomegaly. The average weights of the spleen in the different groups were: surgical cases, 135 g.; rheumatic valvular heart disease, 220 g.; hypertensive and arteriosclerotic heart disease, 198 g. subacute bacterial endocarditis, 371 g. Taking as his standard Barron and Litman's[10] criteria of 200 g. and over as indicating enlargement, and 300 g. as the low limit of clinical palpability, Fowler found that 15% of the spleens in his cases of congestive failure were theoretically palpable. If 3 cases of biliary cirrhosis are excluded the percentage becomes 13·4. Oddly enough, only 1 of these spleens was actually felt during life, in spite of the fact that 3 of them

1. The Internal Fixation of Fractures. CHARLES VENABLE, M.D., M.S., F.A.C.S.; WALTER STUCK, M.D., M.S., F.A.C.S. Oxford: Blackwell Scientific Publications. 1947. Pp. 237. 30s.
2. Dowling, G. B., Gauvain, S., Marrac, D. E. *Brit. med. J.* March 6, p. 430.
3. Charpy, J., Pichat, P. *C.R. Soc. Biol. Paris*, 1947, **141**, 929.
4. Fischer, A., Davidsohn, F. *Nature, Lond.* 1939, **143**, 436; personal communication, 1948.
5. Rørdam, H. N. K. On Cancer. Copenhagen; part 1, 1946: part 2, 1947.
6. White, P. D. Heart Disease. New York, 1945; p. 36.
7. Fishberg, A. M. Heart Failure. London, 1940; p. 261.
8. Lewis, T. Diseases of the Heart. London, 1937; p. 189.
9. Arnett, J. H. *Amer. J. med. Sci.* 1922, **163**, 590.
10. Barron, M., Litman, A. B. *Arch. intern. Med.* 1932, **1**, 240.
11. Fowler, N. O. *Ann. intern. Med.* 1947, **27**, 733.

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weighed 500–700 g. Duration of failure seemed to have little effect on the degree of splenic enlargement, for the average weight of the spleen when failure had existed for three years or more was only 228 g. in 31 cases of rheumatic valvular disease and only 190 g. in 14 cases of hypertensive and arteriosclerotic heart disease. On the other hand, there were 11 cases of cardiac cirrhosis in the rheumatic group, and if 2 of these are excluded because biliary cirrhosis was also present, the average weight of the spleen for the remainder was 274 g. Another noteworthy finding, though the statistical significance of the figures is doubtful, was that in congestive failure on the average the spleen was more enlarged than the liver.

The cause of the splenomegaly in congestive failure is obscure. Cirrhosis of the liver and congestion of the spleen may well be two factors involved, but this is unlikely to be the whole story. The clinical bearing of the findings is more definite. That the spleen was palpated in so few of the cases is not altogether surprising, since many of the patients were in an advanced stage of failure when examined, and orthopnœa, lack of coöperation, and probably ascites would all render examination difficult. The findings suggest that clinicians should be cautious in deciding whether or not a spleen is enlarged. The important point, however, is that a palpable spleen in a patient with heart disease should not lead automatically to a diagnosis of subacute bacterial endocarditis, though it is undoubtedly suggestive of that condition. If there is no supporting evidence of infection the clinician should be prepared to diagnose congestive heart-failure from some other cause.

WORK OF THE COMMONWEALTH FUND

LOOKING back over thirty years, the directors of the Commonwealth Fund [1] can feel that a start has been made with their task, "to do something for the welfare of mankind." Their aim has always been to sponsor long-term projects, and especially projects on behalf of children. They began by encouraging child psychiatry in various ways—by providing clinics and child-guidance centres, and by offering fellowships for those seeking training in psychiatry and for pædiatricians who wished to undertake psychiatric study. In 1946 a successful course in psychotherapy, given to a group of general practitioners, was the symbol of a new outlook: "The Fund has come to think of mental health as an inseparable part of human health."

A child-health programme, begun in 1922, led to wide collaboration with State health departments, where the fund developed county health work and strengthened departmental staffs. Rural hospitals came next: the fund built six of them and paused to take stock. These hospitals were to be health centres concerned with professional education as well as local needs, and were to be developed alongside the public-health service. Some did well along these lines, others not so well. After 1934 seven more hospitals were either built or helped to rebuild, and educational activities were strengthened, though the attempt to link public health and hospital development had to be laid aside. Teaching was by way of the "clinical visit": visiting instructors teach the local men in terms of their own cases. But since "neither doctors nor hospitals rise much above the level of their communities," the fund sought to "enlarge the concept of the community" by making a plan for regional linkage of hospitals. The hospital is an instrument for bettering rural health, and the regional plan has special advantages for the small hospital, making it more effective and "tying it more closely into the over-all pattern of rural health service." This is a benefit we hope to gain from regionalisation of our own health services.

1. Annual Report, 1947. From 41, East Fifty-seventh Street, New York City. Pp. 64.

The fund has made great contributions to teaching and research. Grants are commonly given for three years at a time, and the holders are not harried with questions. Some investigations have been supported, by repeated renewals of grant, for many years; and the fund has "a particular respect for longitudinal clinical research—the study of a few individuals over a long period of time as contrasted with the study of many individuals for brief periods or only in the acute phases of disease." The fund's "fellowships for Britons"—origin of much good fellowship in another sense—were restored after the war, and are nowadays offered to older men than in the past. The psychiatric grants made by the fund to England were earmarked for training, and included a small subsidy to the London Child Guidance Training Centre, and a scholarship fund for the mental-health course at the London School of Economics.

TUBERCULOSIS IN SCHOOL-TEACHERS

AT a recent meeting of the council of the Welsh National Memorial Association reference was made to a Memorandum which Dr. Norman Tattersall, principal medical officer of the association, submitted last autumn to the Joint Tuberculosis Council. After reviewing various cases in which children had contracted tuberculous meningitis while attending classes held by tuberculous teachers, Dr. Tattersall in his memorandum said that tuberculosis officers and medical superintendents in Wales agreed that school-teachers should be examined and radiographed on entry to the profession and periodically thereafter. It was highly probable, he thought, that many teachers who returned to duty after treatment were still occasionally sputum-positive; next to the home the school was the place where a child was most likely to receive a massive and repeated infection, and the risk was greatest in the small rural school. We understand that the Joint Tuberculosis Council has set up a committee, with Dr. Wilfrid Sheldon as chairman, to consider the whole question of tuberculosis among teachers and others whose work places them in control of young people. Meanwhile the Minister of Education has agreed [1] to remind education authorities of the standing instruction that a teacher found to be suffering from active tuberculosis must be suspended from teaching.

RELEASE OF DOCTORS FROM SERVICES

THE Central Medical War Committee have been informed that the release of medical officers in class A will be as follows:

Royal Navy.—April to June, no release.

Royal Army Medical Corps.—General-duty officers: April, group 67; May, group 68; June, group 69. *Specialists in medicine, surgery, and diseases of women and children:* April 1–30, group 62; May 1–14, group 63; May 15–31, group 64; June 1–14, group 65; June 15–30, group 66. *All other specialist medical officers:* April 1–14, group 60; April 15–30, group 61; May 1–14, Group 62; May 15–31, group 63; June 1–14, group 64; June 15–30, group 65.

Royal Air Force.—April, no release; May, group 69; June, no release.

CONGRESS ON INDUSTRIAL MEDICINE

THE 9th international congress, arranged by the Commission Internationale Permanente pour la Médecine du Travail, is to be held in London this year between Sept. 13 and 17, under the patronage of the King and Queen. It will meet in six sections, concerned with various aspects of industrial health (social, environmental, nursing, clinical, practical, and special), rehabilitation being dealt with separately. The office of the congress's British committee is at room 501, Garden Court Wing, B.M.A. House, Tavistock Square, London, W.C.1.

1. See *Lancet*, March 6, p. 390.

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Special Articles

INCIDENCE OF EPILEPSY IN CHILDREN OF SCHOOL AGE

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AT present there are only seven special boarding-schools in England—there are none in Wales—for epileptic children, with accommodation for 660 children, equivalent to 0·12 places per 1000 school-children. There are no special day schools for epileptic children, and the Handicapped Pupils and School Health Service Regulations, 1945, of the Ministry of Education, prescribe a boarding-school, not a day school, for children who require special-school education because of epilepsy.

For many years local education authorities have found increasing difficulty in securing the admission to special schools for epileptics of children with an intelligence quotient of less than 70; and it has been almost impossible to get an epileptic child with an additional physical handicap into any type of school.

To obtain up-to-date information about both the number of epileptic children who ought to be in special schools and the total number of school-children known to be epileptic, an investigation was made in the north-west of England, the Metropolitan area, East Anglia, and some of the Home Counties from October, 1946, to February, 1947. The school population of those areas amounted to about 1,700,000, being about a third, and representing a fair cross-section, of the total school population of England and Wales. I sent a questionnaire to the school medical officers of Liverpool, Manchester, Lancashire, all the county boroughs in Lancashire, the four Cheshire county boroughs of Birkenhead, Wallasey, Stockport, and Chester, London, Middlesex, Essex, Norfolk, Hertfordshire, Bedfordshire, Suffolk (East and West), Cambridgeshire, Huntingdonshire, the Isle of Ely, and the county boroughs of West Ham, Norwich, Southend-on-Sea, Ipswich, and Great Yarmouth. The inquiry gave much work to the investigating medical officers, many of whom carried it out with extreme thoroughness. Since many investigators were concerned, it was inevitable that there would be differing standards of assessment; but it would have been impracticable for one person to have made the survey in such a large and scattered territory; even so, the inquiry yielded information of practical value.

Of the 1,700,000 children surveyed, 519 (0·3 per 1000) were considered to be in need of special-school education. A rate of 0·3 per 1000 is more than twice the rate (0·12 per 1000) at which special-school accommodation is now provided. Of the 519 children, 279 were already in special schools for epileptics and 240 were not; of these 240 children 109 did not attend any type of school, and of the 109 children 33 were also physically defective. Tables I and II give details.

TABLE I—EPILEPTIC CHILDREN IN NEED OF SPECIAL-SCHOOL EDUCATION AMONG 1,700,000 CHILDREN SAMPLED

—	Major			Minor			Total		
	B	G	Total	B	G	Total	B	G	Total
No. educable requiring education in special schools	229	169	398	73	48	121	302	217	519 (0·3 per 1000)
No. in special schools for epileptics	122	88	210	40	29	69	162	117	279
No. not in special schools who ought to have been	107	81	188	33	19	52	140	100	240

B = boys; G = girls.

In this country Manchester has a highly creditable record in having made adequate provision for all Manchester school-children with severe epilepsy; for thirty years Manchester Education Authority has maintained a special boarding-school for 100 epileptic children at Soss Moss, Cheshire, and during that period there have been, on the average, about 40 Manchester children in the school. At the time of this inquiry 41 (0·46 per 1000 school-children) Manchester children were in the Soss Moss school. Experience has shown that where there is ample special-school accommodation the ascertainment-rate is high: and this investigation showed Manchester to be among the few areas that had a high ascertainment-rate.

In Liverpool the survey was conducted with thoroughness, the city's hospitals, as well as schools, being included. Some 59 children (0·5 per 1000) were found to be in need of special-school education, but only 8 were in special schools for epileptics. Wallasey had 6 (0·5 per 1000), Birkenhead 7 (0·49 per 1000), Bolton 0·5 per 1000, Southport 0·48 per 1000, and Warrington 0·43 per 1000 children who required special-school education. Stockport had the high figure of 0·99 per 1000. It would be wrong to pay much attention to any one town's figures at any one time, but the high rates found by different medical officers for these northern towns are noteworthy, especially in view of Manchester's thirty years' experience. The county of Lancashire had a rate of 0·34 per 1000 school-children.

TABLE II—DETAILS OF EDUCABLE EPILEPTIC CHILDREN WHO OUGHT TO HAVE BEEN, BUT WERE NOT, IN SPECIAL SCHOOLS

Condition necessitating special-school attendance	Major epilepsy			Minor epilepsy			Total		
	B	G	Total	B	G	Total	B	G	Total
Frequent and severe fits	82	64	146	24	14	38	106	78	184
Severe epilepsy with difficult behaviour	11	6	17	5	1	6	16	7	23
Epilepsy coupled with physical defect	14	11	25	4	4	8	18	15	33
Totals ..	107	81	188	33	19	52	140	100	240

The north-west of England had a higher rate (0·38 per 1000) than the Metropolitan area (0·27 per 1000), whereas the Metropolitan area had a higher rate than that of East Anglia and some of the Home Counties (0·23 per 1000). Table III summarises this information.

The north-west area is almost entirely, and the Metropolitan area entirely, urban, whereas East Anglia and the Home Counties are partly urban and partly rural. Of the 450,000 school-children in East Anglia and some of the Home Counties about 126,000 lived in districts that are almost wholly rural: Bedfordshire (excluding Luton and Bedford), Cambridgeshire (excluding Cambridge), the Isle of Ely, Huntingdonshire, Norfolk (excluding Norwich), and Suffolk (excluding Ipswich). Of these 126,000 rural children, 37 (0·29 per 1000) required education in special schools for epileptics.

Despite the wide variations in the ascertainment-rates in the three regions sampled, and within the same region, there is clear evidence that the present special-school provision for epileptic children (0·12 places per 1000 school-children) is inadequate. If the rate of 0·3 per 1000 shown by these three regions, involving a third of the school population of England and Wales, is the same as that of the whole country—a reasonable

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assumption on the information given here—instead of 660 special-school places about 1500 are required; and that number would be substantially less than that needed if the experience of Manchester was representative of the country as a whole.

PHYSICALLY HANDICAPPED EPILEPTIC CHILDREN

It is almost impossible to find a special school that will admit these children; most of them remain at home without education. If the sample population is typical of the whole school population, it appears that, of the 5,000,000 school-children in England and Wales, about 100 are epileptics who also have a physical disability. Though this number is small, the need is pressing for boarding-schools specially adapted for the physically handicapped epileptic child.

EPILEPTIC CHILDREN WITH PROBLEMS OF BEHAVIOUR

An interesting finding was the very small number of epileptic children whose behaviour was so bad as to justify admission to a special school; so long, however, as the total special-school accommodation is much less than the demand, the needs of these children will not be met. Of the 240 children ascertained to require special-school education who were not receiving that type of education only 23 were stated to present serious problems of behaviour.

INTELLIGENCE LEVELS

The investigating medical officers were asked to give the results of any intelligence tests carried out on children ascertained to require special-school education; of the 519 children 147 were tested, giving the following results:

I.Q. range ..	*50–54*	*55–69*	*70–84*	*85+*
No. of children ..	14	64	39	30

In Liverpool 57 of the 59 children considered to require special-school education were specially examined by a psychologist, whose findings (on the Stanford revision of the Terman Merril scale) were as follows:

I.Q. range ..	*50–54*	*55–69*	*70–84*	*85+*
No. of children ..	14	23	15	5

Broadly, children who require special-school education because of epilepsy are also educationally retarded. To refuse a child admission to a special school simply because his intelligence quotient is below 70, or even below 60, is doing that child a grave injustice. The very nature of epilepsy and the dulling effect of some forms of medication may combine to lessen a child's response to intelligence testing; to be fair to a child these tests should be given on more than one occasion and should not be applied soon after a seizure. Sometimes a child with an intelligence quotient as low as 55 will do better in school than a child with one over 60. The best, indeed the only reliable, test of a child's educability is to give him a trial at a school that has a curriculum adapted to his educational needs; and that is particularly true of the epileptic child. Even if after a reasonable trial at a school an epileptic pupil is found to be ineducable and in need of colony care, the experience gained at school will often make him a better colonist.

TABLE III—NUMBER OF EDUCABLE EPILEPTIC CHILDREN ANALYSED BY AREAS

Area	School population	No. of educable epileptic children requiring special boarding-school education
North-west England ..	700,000	266 (0·38 per 1000)
Metropolitan area ..	550,000	148 (0·27 per 1000)
East Anglia and some of the Home Counties	450,000	105 (0·23 per 1000)
Totals ..	1,700,000	519 (0·30 per 1000)

The handicap of epilepsy is often a barrier to employment that becomes well-nigh impassable to those who are also educationally subnormal and have not received education suitable to their limited abilities and aptitudes. A retarded epileptic who fails to secure or keep employment is a drag on society and a misery to himself and his associates. Employment is, too, the best anticonvulsant. Thus, both on social and economic grounds it is essential that every epileptic child, even if doubtfully educable, should be given an opportunity for special education.

TABLE IV—TOTAL INCIDENCE OF EPILEPSY AMONG SCHOOL-CHILDREN IN CERTAIN AREAS

Total school population	Major epilepsy			Minor epilepsy			Total
	B	G	Total	B	G	Total	
950,000	234	164	398	202	176	378	776 (0·82 per 1000)

Of these 776 children 319 were under, and 457 were over, twelve years of age.

TOTAL INCIDENCE OF EPILEPSY IN CHILDREN OF SCHOOL AGE

In many districts no information was available other than that known of children who required special-school education. In those districts (school population 950,000) where more complete records were kept the variation in incidence was so wide—from 0·2 to 2·5 per 1000 school-children—as to make any generalisations worthless; the average total incidence was 0·82 per 1000 (table IV). Districts reporting more than 1 epileptic child per 1000 school-children were Norwich (2·5), Stockport (2·3), Cambridgeshire (2·3), Blackpool (1·5), Rochdale (1·5), Warrington (1·5), Bolton (1·3), Cambridge (1·3), Bootle (1·2), Salford (1·1), and East Suffolk (1·1).

A very careful survey was made in Bolton, where 83 children suspected of being epileptic were reviewed; it was finally decided that the diagnosis of idiopathic epilepsy was firmly established in 23 children only, giving a rate of 1·3 per 1000 school-children; of the 23 children 11 were boys and 12 were girls, and in 1 only was petit mal diagnosed.

A critical review was also carried out in Blackpool, where 19 children—8 boys and 11 girls, all with major epilepsy—were finally considered to be epileptic, giving a rate of 1·5 per 1000 school-children. That only 1 of the 42 epileptic school-children in those two towns was considered to have petit mal is striking. On the other hand, Norwich, Stockport, and Cambridgeshire were the only districts that gave a rate exceeding 2 per 1000, and in all three an appreciable number of epileptic children were stated to have petit mal: 25 of the 35 Norwich children, 22 of the 37 Stockport children, and 5 of the 18 Cambridgeshire children. Since petit mal is not always easy to diagnose, it is understandable that the incidence found by different doctors varied considerably.

Unfortunately, information about the total incidence of epilepsy in school-children is very incomplete in most parts of the country. In view of the social importance of idiopathic epilepsy, and since its onset is uncommon after adolescence, it is to be hoped that in future the school health service will take an increased interest in the whole problem of epilepsy in children; it is the only agency having wide facilities for investigating epilepsy in the child population; and it has, too, unrivalled opportunities for educating public opinion, including medical and educational opinion, on the need for a more realistic attitude by the community towards the epileptic. Far too often the diagnosis of epilepsy affects an indivi-

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dual as if the finger of doom marked him out from his fellows; his handicap is severe enough without having it increased by public ignorance. And it is inexcusable that educable epileptic children requiring special education should be deprived of it merely owing to lack of facilities. In view of the very inadequate provision of special schools for epileptic children in this country, especially those who are also educationally subnormal, there is little wonder that many of them fail to secure employment, or become casual workers, when they enter adult life.

EMPLOYMENT AND AFTERCARE OF EPILEPTICS

In Liverpool 41 epileptics who had left school were followed up when the present investigation was being made. Only 15 were in full employment, 18 had "practically no employment," and 8 were employed "up to about half-time"; only 18 had registered as disabled persons; and only 22 were under regular medical treatment.

It is essential that the school health service should ascertain all epileptic children to ensure not only that they receive education suitable to their needs and that they are given adequate medical treatment but also that effective aftercare can be organised—no form of aftercare will, however, compensate for lost educational opportunities in the school years. A comprehensive national health service ought to make it possible for continuous medical care to be given to epileptics right through their lives; our hope must be that the new National Health Service will take a lively interest in the problems of the epileptic and that clinics will be set up similar in purpose to the one recently established by the London County Council at St. John's Hospital, Battersea.[1] This clinic was started to help the "considerable number" of epileptics who "often find it hard to secure a place in industry" and who "are known to be drifting about in the community in need of medical advice or of help with their social problems."

What happens in London and Liverpool occurs elsewhere in this country. Apathy and ignorance have persisted too long. Well over 2000 years ago Hippocrates complained that much of the popular misconception about epilepsy was due to "men's inexperience"; if he were alive today he would still have much cause for complaint.

The remedies are as follows:

(1) Proper ascertainment during the school years.

(2) Adequate educational provision suitable to the needs of all types of epileptic children, especially for those who are also educationally subnormal or physically handicapped, since, on leaving school, they are the most likely to find difficulty in securing, or retaining, employment. It must be made plain that the big majority of epileptic children can, and should, be educated in ordinary schools, but they must be under close medical supervision.

(3) As complete medical treatment as modern knowledge permits.

(4) Effective aftercare with the object of securing whole-time employment.

(5) A more enlightened public and professional opinion.

SUMMARY

A school population of about 1,700,000 children—about a third of the total school population of England and Wales—yielded 519 educable epileptic children (0·3 per 1000 school-children) who were considered to be in need of education in special schools for epileptics.

The number of educable epileptic children requiring special boarding-school education ranged from 0·38 per 1000 school population in north-west England to 0·27 per 1000 in the Metropolitan area and 0·23 per 1000 in East Anglia and some of the Home Counties. A mainly rural school population of 126,000 children gave a rate of 0·29 per 1000.

In England and Wales there may be about 100 epileptic children who are also physically handicapped.

There are only 7 special boarding-schools, with accommodation for 660 epileptic children (0·12 places per 1000 school-children), in England (none in Wales) at present. If the information obtained from this inquiry is representative of the country as a whole—a reasonable assumption—there is need for 800–1000 additional special-school places for epileptic children. And the most pressing need is for the provision of special schools for epileptic children who are also educationally subnormal. That the provision of special schools at the rate of 0·3 per 1000 school-children is not too high is shown by the experience of Manchester: for thirty years Manchester has maintained about 0·4 per 1000 of its school-children in its own special-boarding-school for epileptic children at Soss Moss, in Cheshire.

A school population of 950,000 children yielded 776 pupils (0·82 per 1000 school-children) who were considered to be epileptic; but this rate is too low and is more likely to be from 1 to 2 per 1000 school-children.

Emphasis is laid on the need of (1) proper ascertainment by the school health service; (2) greatly increased special educational facilities; (3) regular medical treatment; (4) effective aftercare; and (5) a more enlightened public opinion.

I acknowledge with gratitude the information and the help given to me by the school medical officers (and in Liverpool, Dr. Gamlin; in Manchester, Dr. Jenkins; and in Lancashire, Dr. Eldridge) of the following areas who really did most of the work in this investigation—I simply gathered and sorted the fruits of their labour—Barrow-in-Furness, Bedford, Bedfordshire, Birkenhead, Blackburn, Blackpool, Bolton, Bootle, Burnley, Bury, Cambridge, Cambridgeshire, Chester, Essex, Great Yarmouth, Hertfordshire, Huntingdonshire, Ipswich, Isle of Ely, Lancashire, Liverpool, London, Luton, Manchester, Middlesex, Norfolk, Norwich, Oldham, Preston, Rochdale, Salford, Southend-on-Sea, Southport, St. Helens, Stockport, Suffolk (East and West), Wallasey, Warrington, West Ham, and Wigan.

1. Daley, A. *Lancet*, 1947, i, 349.

CRANIAL OPERATION AT SEA

THE following notes on a fine example of emergency surgery by a ship's surgeon are based on reports reaching Dr. F. A. Wilson, medical superintendent of the Blue Funnel Line.

At 10 A.M. on Aug. 27, 1947, the master of the S.S. *Nestor*, nine days off Cape Town, acknowledged a radio request for medical assistance from another steamship. What ensued can be gathered from the messages subsequently received by the *Nestor*.

> 11.18 A.M.—"Man who is ill was apparently struck with a cleaver on head by the chief cook, who is now missing, presumed jumped overboard. Patient is semiconscious, bathed in perspiration, dilated eyes, has lost considerable amount of blood, wound on top of head about seven inches long, have bandaged his head but not stitched wound. At present bleeding ceased, have not given patient any stimulant. Will you board us or shall I bring patient to you? Do you advise patient anything to cause sleep?"

Dr. J. A. Peirce, ship's surgeon on the *Nestor*, advised no stimulants or other medication.

> 12.50 P.M.—"Will bring patient to you on contacting. Pulse 50, temperature 100°, slight yellow stain at mouth."
>
> 6.33 P.M.—". . . Patient's pulse 56, temperature 101°, unconscious, have not disturbed dressing on wound. On contact I will lay astern you and will bring patient over by naval stretcher. . . ."

The patient was received on board the *Nestor* at 10.30 P.M., and was thereafter in the care of Dr. Peirce,

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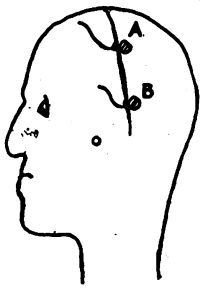
who found a youth with a deep laceration some 6 in. long, extending from 1 in. above and behind the left external auditory meatus to the right side of the vertex, passing slightly forwards. All bleeding had by this time ceased, and in the depths of the wound herniated brain was seen passing through a wide and extensive comminuted fissured fracture. Depression of the parietal bone was evident in two areas, and the use of a probe suggested loose fragments lying in the extradural space or deep to this plane.



At 11 P.M. operation was begun. The head was shaved, the wound and adjacent areas cleaned, and the edges of the wound excised and retracted through skin and pericranium to display the extent of the injury. Fracture lines were seen as in the diagram, being almost totally confined to the left parietal bone, with wide separation from A to B and considerable depression at both these areas. Much hair had been carried into the main fracture line, where it lay among the herniated brain. At both A and B loose fragments had obviously been carried into the brain, and the membranes were widely and raggedly torn. Trephining was carried out as shown, at both points, the depressed bone elevated, and six loose fragments removed. Despite the apparent patency of the skull there was an extensive extradural hæmatoma, which was released during the search for bony fragments. No attempt was made to repair the dura or to replace trephined bone. The periosteum, pericranium, and skin were closed with drainage to the extradural space. After the operation the patient stopped breathing seven times, but artificial respiration was effective, and his pulse, which had steadily quickened, was at all times full and regular.

The lad progressed favourably, consciousness returning after 24 hours and full orientation on the third day, while speech and comprehension did not seem to be severely impaired. There remained a right-sided hemiplegia, the paralysis still being flaccid but tending to become spastic in type. Sensory defects were not prominent.

On Oct. 2 Dr. M. J. Zion, of Cape Town, reported that the head wound was almost healed, and that the patient was gradually regaining the use of his right arm, and could slightly use the affected leg. His general condition was very good, he was eating and sleeping well, and was very cheerful.

Medicine and the Law

Cash Value of a Doctor's Life

LAST month at Leeds assizes a widow was awarded £15,025 damages for the death of her husband, a medical practitioner aged 33, who had been fatally injured by the negligence of a lorry-driver. The liability of the defendants had been admitted; the sole issue for the court was the amount of the damages. Counsel for the defendants, doing his duty in endeavouring to keep the sum low, suggested that the judge should take into account the probability that, under the new National Health Service Act, the deceased doctor would probably not have joined the scheme and therefore would have been so much the worse off. Mr. Justice Byrne, however, having regard to the doctor's high standard in his profession, inclined to the view that non-entry into the National Health Service would have increased the number of the doctor's private patients considerably. The deceased, according to the evidence, was the son of a Durham miner and had been the architect of his own fortunes. He won scholarships which took him to King's College, Newcastle; graduating as a doctor in 1937, he bought a practice in 1945 for £3000 by means of a bank overdraft which he had been repaying. He had 2624 panel patients, 800 club patients, and 700 private patients; his net profit for his first year was £3315.

Assessments of damages in cases of this kind are admittedly uncertain. Members of the bar have the habit of describing one member of the bench as a "plaintiff's judge" and another as a "defendant's judge"; they tend to fight their claims hopefully to the last before a "plaintiff's judge," and to settle them early if the case comes before a "defendant's judge." The nominal defendants are the less concerned which type of tribunal they encounter; they are covered by insurance, and the insurance company will pay. The rather conspicuous fluctuations in the sums awarded in this type of litigation are doubtless inevitable, since each case must be decided upon its own special facts. Some Continental systems, however, have found it possible to apply rough tabular standards; in cases of injury the degree of incapacity or disability is fixed at a certain percentage; this, with the age of the injured person, determines the award of damages on approximately uniform lines. In England the Court of Appeal may comment upon the generosity or inadequacy of an award by the trial court, but the trial judge, who nowadays has so often to undertake the task of a jury, must do his best. Twelve jurymen might each write down their own idea of what the award should be; the total could then be added up and divided by twelve; the judge, left to himself, has no such resource. It is sometimes said that judges have given even larger awards than juries used to do; but the rate of interest on the award, in an era of cheap money, has to be borne in mind.

It is obvious that monetary compensation cannot meet a plaintiff's claim. Lord Justice Greer, in Roach *v.* Yates (1937), a case of serious injury due to a defendant's negligence, commented on the difficulty o assessing the damages because no sum of money could compensate a man who had been subjected to the injuries and sufferings which the plaintiff had endured and would endure. "If the court gave him £10,000, or £20,000 (which I think was given in another case by a learned judge), it will not be giving him something which he would rather have than the continuance of his healthy life; in my judgment one cannot estimate the damages on that basis." Lord Justice Greer went on to quote words used in Phillips *v.* London and South Western Railway in 1879, where a surgeon of middle age, earning an income of from £6000 to £7000 a year, was made helpless with no hope of recovery. As regards his personal injuries and sufferings the jury were told that they could not put him back into his original position; they must bring their reasonable common sense to bear, remembering that this was the only occasion when he could claim compensation. As regards loss of future income "you are not to give the value of an annuity of the same amount as the plaintiff's average income for the rest of his life. If you gave that, you might be disregarding some of the contingencies. An accident might have taken the plaintiff off within a year; he might have lived, on the other hand, twenty years and yet many things might have happened to prevent his continuing his practice." The jury awarded £7000 damages, and a new trial was ordered on the ground that the sum was inadequate. "We are not," said Lord Justice Greer in Roach *v.* Yates, "to give as damages the price that he would have accepted in exchange for the life he preferred to go on living." Similarly in the recent case at Leeds the court could hardly attempt to assess a figure which a wife would be ready to accept in place of a husband. If the present value of money be considered, then whether or no the topical reference to State medical service be allowed any bearing, the award of £15,000 does not seem excessive or surprising.

"It is essential to remember that in dealing with parents, as, in fact, in all psychiatric work, time is of the greatest importance. The course of cases cannot be hurried. They must take their own pace, and, though it often seems as if we were wasting time, the slow, sticky spots generally precede advance, if the case is going forward at all. Experience is the only cure for the urge to hurry, and it is almost unbelievable how the whole structure of a case will evolve, given time, merely by allowing a parent to talk out worries and regrets with as few comments and interruptions as possible."—Dr. WILLIAM MOODY. *Child Guidance*. London, 1948.

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In England Now

A Running Commentary by Peripatetic Correspondents

ANÆSTHESIA is still drama outside the English-speaking countries. I was told that the patient was going to have a small tumour of the lower jaw removed. Would I administer general anæsthesia, which had never previously been used for such operations in that clinic? It sounded too easy.

A banquet of honour the previous evening had left me in no mood to think of the patient until 7.30 next morning, when I opened my eyes and realised that the operation was due to begin at 8 A.M. The professor and about half a dozen assistants were already robed in cap, gown, mask, and gloves when I arrived. The patient was ready on the operating-table, I was told. On asking for the anæsthetic apparatus, a new and unused American apparatus that I had never seen before, and of rather terrifying appearance, was wheeled in. It had evidently been bought, when the hospital was equipped, as part of the standard fittings every hospital should have. Two breathing tubes emerged from the machine, so a safe diagnosis was that it was a carbon-dioxide absorber, but there seemed no other way of using it. Soda lime? Never heard of it. Endotracheal tubes? Blank looks. A few pieces of limp rubber tubing, rather like drainage tubing, were finally produced. My blood-pressure began to sink and a fine sweat broke out all over me. The one and only cylinder of nitrous oxide was produced and that turned out to be empty when tested. By means of adhesive tape, odd bits of tubing, a glass funnel, and some gauze, I managed to rig up something which might work and let me administer an endotracheal anæsthetic. A nod from me and I was led into the operating-theatre like a lamb to the slaughter.

The theatre consisted of an enormous auditorium in which some 200 students, all in white, in tiered rows, looked down into a sunken well in the centre in which was the table surrounded by a great number of surgeons and assistants. The patient proved to have a large tumour of his lower jaw. For some obscure reason his jaws were wired together so that he could barely open his mouth. He was so heavily morphinised as to be hardly breathing. My limp rubber tubes seemed rather ineffectual. Carbon dioxide, of which there was plenty in the theatre, soon made the patient breathe deeply, and a rubber tube thrust into his nose found its way into the larynx, confirming my belief in the efficacy of simultaneously keeping one's fingers crossed and touching wood. As soon as the tube entered the larynx an audible murmur arose from the audience, who thereupon got up as one man and left the theatre, to my utter amazement. The rest of the operation was uneventful.

The patient did nicely; but it took several days to refill my depleted suprarenals.

* * *

Now that another cricket season is only just around the corner, perhaps I ought to reveal what really happened on that second day of the Oval Test-match against India two years ago. Having no ticket, my only hope of admission was after the tea interval; so I duly queued up, clad in Army uniform and clutching some newspapers, a mackintosh, and a large envelope containing a few dozen life-size photographs depicting, in stark and vivid detail, the various local lesions that can result from treponemata and allied organisms. The turnstiles were finally passed and there was a happy release from the pressure of the queue amidst the milling throng at the back of the pavilion. It was while I was groping from pocket to pocket to find the money for a match-card that the precious envelope fell from under my arm, spilling the pictures face upwards on the ground. I hastily dropped the waterproof in an attempt to cover them up, but a gust of wind appeared from nowhere and scattered them in all directions.

The next few minutes are confused in my mind. I can remember fumbling with the photographs at my feet and dropping as many as I picked up. I retain impressions of many legs and of more than disinterested assistance from those who were close at hand; of a small boy running down to the turnstiles and returning, crying, "Here you are Mister!" waving a large picture above his head. Some instinct told me that it would be the one showing the secondary manifestations in the female: it was. Finally, with all recovered, the boy paid off, and the crowd dissolved, my composure began to return. As I was trying to get into the stand the sole remaining spectator, a swarthy man with coat collar turned up and hat pulled down over his face, sidled up to me and, giving a meaning look, softly asked: "Excuse me, sir. Those photographs: are they for sale?"

* * *

The visitor to the United States soon observes three things: the apparent plenty; the high cost of that plenty; and the readiness of America to share its material goods with Europe. In the Super-Markets—self-service food stores—all our rationed and points foods, and many we never see, are piled on the open counters for the American housewife to load into her basket-on-wheels. Yet in fact her purchases are restricted by the high prices—to give an extreme example, butter at this season is nearly a dollar a pound.

The readiness to share with Europe is evident at every level down to the grass-roots. Congress has voted the funds for Interim Aid to Europe; the President calls for the enactment of the European Recovery Program. The Friendship Trains and the Friend Ships have delivered to France and to Italy their cargoes of food voluntarily given by communities and by citizens. Individual donors send to individual recipients gift parcels of food and other necessities through non-profit-making organisations such as CARE (Coöperative for American Remittances to Europe), or through many commercial firms, or make up their own parcels. Innumerable communities in the U.S.A. have adopted their eponymous communities in Europe. Special groups of all kinds assist their sister groups. No doubt there are some dissidents, and indeed I have read of some in the newspapers, but I have not met any yet, or at least they have not revealed themselves to me.

* * *

What goes on in the schizophrenic mind? This brilliant undergraduate and minor poet had been in catatonic stupor for nearly eight years, lying in bed with his knees flexed and his head raised off the pillow, staring and speechless. For the last year he had been tube-fed. Then his frontal lobes were cut and he began to eat. Another six months elapsed before he spoke; quietly, slowly, condescendingly, but sensibly. When I met him he was reading, sitting in his wheelchair with ankylosed knees. One is always struck by the solemn preoccupation of these people, and I could not refrain from asking him eventually: "Have you got your sense of humour back?" "I don't think I ever lost it," was his smiling reply.

* * *

I had been in Malaya for only a few weeks when they told me to keep next Tuesday free to examine the estate dressers in preventive medicine. There had been no examinations all the time the Japs were here so there were plenty of candidates. Being new to the country I looked forward to Tuesday for I was sure I would learn a lot. I did. Among the things I learned was that "typhus is spread by lies," that "herbs grow on the lips in malignant tertian malaria," and that "the serum is given by an indrawn muscular injection." It was an interesting experience, but I fear that the enthusiastic candidate who would cope with a smallpox epidemic by "vaccinating everyone, then wrapping the patients in sheets soaked in formalin before burying them, and burning all contacts" would stop more than the epidemic!

* * *

Meeting one of my former chiefs at the Royal Society of Medicine he inquired how I was. "I'm a bit off colour, sir," I told him. "Yes, you are; you're jaundiced," was the reply. So that was it—infective hepatitis. Hence the nausea, anorexia, and lethargy, and, come to think of it, my urine was rather dark. Is this the first case of a correct diagnosis at No. 1, Wimpole Street?

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Letters to the Editor

DIETARY PUNISHMENT IN PRISON

SIR,—A point which may well exercise medical opinion during the present discussion of penal reform is the retention of what is termed dietary punishment in British gaols. The idea of prison has so long been associated with that of bread-and-water that it is difficult to open an argument on the rationality of such an idea, while the public in general feels, not unreasonably, that when rations are short prisoners should not be "pampered."

However, the recent disturbances in Dartmoor over food served in the prison underline the problem. Of 105 men who staged a protest shortly before Christmas by refusing to leave the prison yard (no violence seems to have been involved) 53 were cautioned, 30 were summarily punished by the governor, and 22 were dealt with by the magistrates. All of these were allotted, among other things, dietary punishment and deprivation of mattress.

I cite this case as an instance of the circumstances in which dietary punishment is applied. A correspondent informs me that it consists of two stages—a shorter of no. 1 diet and a longer of no. 2. The figures which he gives (based, I believe, on personal experience of them) are as follows:

No. 1: breakfast 6 oz. bread; dinner 3 oz. bread; tea 6 oz. bread.

No. 2: breakfast 6 oz. bread; dinner 6 oz. bread, and porridge or 2–3 small potatoes; tea 6 oz. bread.

The striking feature of these punishments in the present case is that in 18 instances they were imposed for 57 days, in 2 for 29 days, and in 2 for 38 days. I understand that the statutory maximum is 57 days, consisting of 3 days' bread-and-water and 3 days' prison diet alternately for 15 days, followed by 21 days' no. 2 diet, 7 days' ordinary diet, and 14 days' no. 2 diet.

We have before us the statement of Mr. Chuter Ede that without recourse to torture, in the form of flogging, it is impossible to induce prisoners to remain docile under the conditions of overcrowding which now exist, and it is perhaps an inopportune moment to begin a medical inquiry into prison diet; but the matter is of general interest and will become more so if attempts at psychotherapy are to be made in prison. Hunger is a bad physician and not a very successful reformer. Assuming that the facts given to me are correct, the question of prison diet and dietary punishment seems as worthy of medical inquiry as the even more complicated question of sexual deprivation in prison.

London, S.E.23. ALEXANDER COMFORT.

MEDIA OF HEALTH EDUCATION

SIR,—I read with interest the article by Mr. Cyril Bibby in your issue of Jan. 24. The media described by Mr. Bibby are familiar tools in health education on the North American continent. There are a number of others which we employ, but I wish to comment only on some observations by Mr. Bibby.

In Canada and in the United States the popular press is by no means an unknown factor in health education; in Canada public health has had splendid support from the press, though we spend relatively little on newspaper and periodical advertising. The official health agencies have never employed paid advertising much for the purpose of informing and educating the public. Perhaps the department of public health of the Province of Saskatchewan has been more active in this than the others, but even here such advertising is occasional and usually related to some specific undertaking or event. At such times paid advertising is part of a concerted programme devised to reach the public by as many channels as possible at one time—a mass attack as it were.

The press in Saskatchewan have readily accepted timed news releases distributed by the division of health education of the provincial department. These are written by an experienced journalist on the staff of the division in the style and form most acceptable to editors. In the first week of February the daily newspapers almost without exception published four releases on venereal-disease prevention alone. In the same week the division advertised a radio programme. Since radio programmes are presented irregularly, some advance notice must be given by paid advertising.

There is a certain amount of general advertising on health subjects. This, however, is stimulated by voluntary agencies, such as the Health League of Canada and the Canadian Cancer Society. These national agencies prepare attractive advertising material in consultation with the newspaper associations. The space is sold by the newspapers to commercial enterprises which support the cause as a matter of good will or public relations. This "sponsored" advertising is confined to certain times of the year such as the Health League's "National Immunisation Week."

A note, too, on films. Silent projectors are virtually unknown in Saskatchewan, and a growing proportion of the 4500 elementary schools are equipped with 16 mm. sound projectors and 35 mm. film-strip projectors; and numbers of them are acquiring radios and gramophones. We have long since abandoned radio talks or lectures unless the circumstances are exceptional. Our radio programmes are generally dramatised; or they are interesting panel discussions or interviews. We use seven local stations, sometimes as a network.

The mechanical devices suggested by Mr. Bibby have been used here for a number of years in window displays, and in exhibits or side-shows at country fairs and agricultural or industrial exhibitions.

Progressive health departments in the United States and Canada employ health educators to coördinate and direct all health education activities. They use every available medium and technique in an effort to influence people to develop habits and attitudes conducive to higher standards of personal and community health. The health educator interprets the department's programme and the laws and regulations which it administers; he relates the programme to the dynamic of living. Standards of education and training have been prescribed for this relatively new profession; but much excellent work is being done by persons without formal training who have natural talent and have acquired skills in what is here called "the hard way."

Department of Public Health, Regina, Saskatchewan. CHRISTIAN SMITH Director of Health Education.

CALCIFEROL IN THE TREATMENT OF CHILBLAINS

SIR,—We know little about the pathology of chilblains and less about how to treat them. Our ignorance is equally profound as to the physiological effects of calciferol in man. There is an enormous international literature abounding in facts about the chemistry of calciferol and the results of its administration to animals and to patients suffering from an increasing variety of diseases. We are still, however, completely in the dark as to how these clinical results have been arrived at, and we do not even know how to calculate the optimum dosage for a given case or whether to give it by mouth, subcutaneously, or intravenously. Such problems, which are of the greatest theoretical and practical importance, can only be solved by a combination of clinical and laboratory observations on human clinical material. I was hoping that Dr. Anning, in his article of Nov. 29 (p. 794), would furnish us with findings of this kind, but I found the article not only unilluminating but misleading.

In his first sentence Dr. Anning makes four claims which are at variance with known facts. He writes, "Since this therapy" (calciferol in high doses) "is hazardous unless controlled by estimations of blood-calcium (especially diffusible calcium) and of renal efficiency, it seemed important to assess its effects on chilblains." The published facts are very different.

(1) Reed et al.[1] show that symptoms of toxicity from overdosage with calciferol are most unlikely to arise in the dog or in man unless the daily dosage exceeds 20,000 I.U. per kg. per day. Dr. Anning's patients were all adults. The mean weight for his series would therefore have been not less than 50 kg. His patients should have been able to tolerate a daily

1. Reed, C. I., Struck, A. C., Steck, I. E. Vitamin D. Chicago, 1930; p. 204.

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dose of 1,000,000 units (50 × 20,000) without signs or symptoms of overdosage. They were actually given from 50,000 to 150,000 I.U. per day in tablet form!

(2) The blood-calcium level bears no relation to the degree of hypervitaminosis. The same authors [2] showed that the blood-calcium fluctuations in dogs given lethal doses of calciferol—30,000 to 60,000 I.U. per kg. per day—kept within normal limits up to death. Taylor and Weld [3] also showed that hypercalcæmia can be consistent with the absence of any symptoms or signs of hypervitaminosis and that severe clinical hypervitaminosis can occur without an abnormal rise in the blood-calcium.

(3) Greenberg and Gunther [4] and Compere et al.[5] have found that the ratio of diffusible to protein-bound calcium remains remarkably constant in all conditions except when there is disturbed parathyroid function. There is no evidence that calciferol administration alters this ratio.

(4) The fact that renal tubular lesions have been found experimentally in animals killed by enormous doses of calciferol does not justify the assumption that subtoxic doses would harm the kidney in man. There is no evidence of impaired renal function as the result of ordinary therapeutic doses of calciferol.

On the basis of statistics derived from a single clinical experiment, Dr. Anning sums up as follows:

"These results suggest that calciferol is ineffective in preventing chilblains. Further, calciferol appears to have no effect in the treatment of chilblains," and finally, "As treatment with calciferol in high dosage is not without danger, it would be as well if its use for this purpose were discontinued."

Surely Dr. Anning is not entitled to make such sweeping statements without having (*a*) attempted to prove that his tablets were absorbed and compared the results of the same dose in solution; (*b*) tried the effect of a dosage ranging from very small up to the maximum compatible with safety (i.e., 20,000 I.U. per kg. per day by oral, intradermal, subcutaneous, intramuscular, and intravenous routes); and (*c*) correlated such experiments with the influence of varying diets, with and without supplements of different salts of calcium and phosphorus?

Your annotation in the same issue (p. 800) is more careful as regards facts but scarcely more helpful. You also raise the bogy of the dangers of hypervitaminosis—without specifying the known limits of safety—and of "temporary or permanent renal damage." You refer to Percival and Stewart,[6] who showed that the blood-calcium level was consistently normal in chilblain subjects. Are we to deduce from this that the calcium metabolism of chilblain subjects is necessarily normal? We who have worked on this subject know that there can be a serious disturbance of calcium metabolism without any change in the blood-calcium level. To assume that calcium plays no part in the ætiology of chilblains on such grounds is bad reasoning. It is also begging the question to write that "adequate central heating banishes chilblains." Even if this were true, are post-war housing conditions conducive to a mushroom growth of central-heating plants? The crux of the chilblain problem is that many people do *not* get chilblains even in the absence of adequate heating indoors and protection from excessive exposure outdoors. The chilblain subject is predisposed to them, partly by constitutional factors and partly by a variety of physiopathological acquired factors. One such factor is that of cell-wall permeability. We know that alterations in the Ca+Mg/Na+K ratio influence this permeability in vitro and, by assumption, in vivo. Hence the calcium metabolism of most chilblain subjects is probably abnormal in some respect. The older clinicians who gave calcium salts for chilblains, on empirical grounds, were good clinical observers. It is for us to work out the mechanism experimentally.

We know that calciferol influences calcium and phosphorus metabolism, though the mechanism is far from clear. It would therefore be reasonable to infer that calciferol, given in the right dose, in the right manner, and in combination with other measures, will exert some influence on the incidence and development of chilblains in those predisposed to them. My own experience with oral and subcutaneous calciferol has been disappointing. For some years I have used Dr. James Cyriax's method of intravenous injection of colloidal calcium with 'Ostelin.' In about 70% of cases thus treated one or two injections of 10–20 ml. (50,000–100,000 I.U. calciferol + 5–10 mg. colloidal calcium) cleared up the condition and kept the patient free of chilblains for the rest of the winter. During 1934 and 1935 I did some biochemical work on a small series of cases treated by Dr. Cyriax in this way. Unfortunately the work was confined to blood analysis. There seemed to be no correlation between the doses injected, the clinical effects, and either the magnitude or direction of change in the blood levels of calcium, inorganic phosphorus, cholesterol, or lecithin, or in the bicarbonate reserve, plasma-protein picture, viscosity, or refraction. Such figures must be correlated with intake and output figures, and with instrumental recordings of changes in the arterial, venous, and capillary circulations and skin temperatures if useful conclusions are to be drawn.

There is no lack of clinical material. It is to be hoped that a group of clinical workers with the necessary zeal and patience and laboratory facilities for really comprehensive work will undertake the laborious task of elucidating these complex problems.

Como, Italy. E. OBERMER.

2. *Ibid*, p. 153.
3. Taylor, N. B., Weld, C. B. *Brit. J. exp. Path.* 1932, **13**, 109.
4. Greenberg, D. M., Gunther, L. *Arch. intern. Med.* 1930, **46**, 72.
5. Compere, E. L., McLean, F. C., Hastings, A. D. *Amer. J. Dis. Child.* 1935, **50**, 55.
6. Percival, G. H., Stewart, C. P. *Brit. J. Derm.* 1924, **39**, 144.

THE WALKING CALLIPER

SIR,—I should like to congratulate Mr. Charnley on his most interesting article in your issue of Sept. 27.

Obviously, it is not essential to have such a wide range of ring shapes as that described in the article. I have met with an even larger variety but have found only one type which I consider suitable for nearly all patients destined to wear a weight-relieving calliper. The only exceptions are very stout patients; in them it is almost impossible to locate the tuber ischii, so all one can hope for is a good seat-bearing.

This ring (fig. 1) is ovoid in shape, with an indentation at the posteromedial section and a sharp drop just posterior to the medial side-member. It is essential that the slope of the posterior section of the ring terminates midway between the lateral and medial side-members; and from this point to where the sharp drop begins (that is, the indented section) the ring must be perfectly

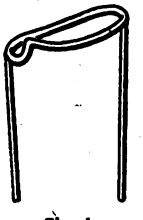

Fig. 1.

Fig. 2.

horizontal, to prevent the tuber ischii gravitating to the perineal section of the ring, thus causing an internal rotation of the limb in walking.

As regards fittings, I consider an anterior thigh tray (fig. 2) essential to give a good pressure on the anterior aspect of the thigh; this prevents the tuber ischii slipping forward and thus impairing the efficiency of the splint. The tray should consist of a soft leather band approximately 4–5 in. in width with strap-and-buckle adjustment. With such a wide distribution of pressure, the patient can tolerate as much pressure as one wishes to apply; but the narrow webbing band fitted by some makers tends to cause extreme discomfort. The only other fittings needed are a knee-cap and either a posterior knee tray or a calf tray; these help to maintain the limb in a restful position in the appliance.

The ingenious type of ring designed by Mr. Charnley certainly has its advantages; but I do not consider it to be one that could be universally adopted. Though excellent for Service patients, it might prove less useful in ordinary hospital practice. Many of the patients in civilian hospitals are elderly and could not tolerate the tightness of the ring on which its effectiveness depends. The question then arises: if the tightness of the ring is

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varied with the patient concerned, how can one be sure of maintaining a tuber-ischii seat?

I have seen calliper splints made with non-adjustable *posterior* thigh trays, and sometimes with *posterior* trays extending from just below the ring to within 3 in. of the malleoli; but I fail to see how these trays can do anything but prevent the tuber ischii seating on the ring.

There is no doubt that H. O. Thomas was the original designer of the walking-calliper splint; and I think I am right in saying that he never stated that the tuber ischii should rest on the ring. The oval type he designed for the bed splint; then, when the patient was ready for walking, the end was cut off and the ends turned at an angle of 90° from about 1¼ in. up, to fit into a tubular heel socket. I have seen this practised until quite lately, but the patients definitely had a perineal bearing causing quite severe discomfort.

In cases of poliomyelitis and spinal injury, the bucket-top design is by far the best, if possible with a moulded seat for the tuber ischii; but quite often the thigh muscles are much wasted, and, to give a good seat for the tuber ischii, the seat must protrude so far posteriorly that it is extremely uncomfortable for the patient to sit for any length of time. If a non-weight bucket is used the knee and sometimes the ankle tend to deviate medially, and genu valgum can be noted in a very short time. The only safeguard against this is to fit a corrective type of knee-cap which, apart from being an added nuisance to the patient, is not so effective as a weight-bearing bucket.

I am afraid that I must agree with Mr. Charnley in his attack on "commercial callipers"; but their deficiencies are due solely to the shortage of skilled fitters. Three further points should be emphasised:

1. Three-year courses are being held for surgical technicians; the value of such theoretical teaching is not to be denied, but without practical experience of fitting appliances training is but half finished.

2. To be an efficient fitter of surgical appliances, the technician must have had workshop experience. There is at present a deplorable practice in some hospitals of employing or allowing to attend semi-skilled fitters, and of relying on the surgeon to indicate the defects in the appliances.

3. To supply surgical appliances from stock is a practical proposition, but at present this requires an extensive range of interchangeable parts. It would be an inestimable boon, especially under present conditions, if a medical committee could be organised to plan and advise as to the most suitable design, not only for the walking calliper but for all surgical appliances. Such appliances could then be produced at much lower cost, and a swift hospital service ensured; and in this way the situation could be avoided in which surgeons sometimes have to content themselves with a particular manufacturer's fancied modification.

Instrument manufacturers would welcome further articles such as that of Mr. Charnley.

London, S.W.17. C. R. HOWARD.

PERINEPHRIC ABSCESS TREATED WITH PENICILLIN

SIR,—Shafar and Garber [1] have described a case of perinephric abscess successfully treated with sulphadiazine and penicillin; and they referred to a case reported by Ockuly et al.[2] A similar case is reported here.

An airman, aged 20, was admitted to hospital on July 23, 1945, complaining that for five days he had had pain in the lower left quadrant of the abdomen; he had also had crops of boils on his arms. His temperature was 100·4°F; there was tenderness and muscle guarding in the left flank. The urine was chemically and microscopically normal, and culture was sterile. The white blood-cell count was 12,650 per c.mm., and repeated blood-cultures were negative. The pyrexia continued, rising as high as 101·8°F, and on July 27 a mass was felt on the left side of the abdomen, extending from the loin to the pelvic brim; no fluctuation could be elicited and X-ray examination of abdomen and chest showed no abnormality. It was considered that the condition was due to an infection of the perinephric tissue. Penicillin treatment was started the same day; 20,000 units was injected intramuscularly three-hourly; on Aug. 4 the course was completed with 1,200,000 units. The condition of the patient immediately improved; the white blood-cell count was 9000 on July 31; the patient was afebrile on Aug. 3; and the mass in the left abdomen decreased gradually. The patient was discharged from hospital to a convalescent depot on Aug. 18, and he has since remained well.

I wish to thank Brigadier W. D. Anderton, D.D.M.S., Malta Command, and Lieut.-Colonel Rea, O.C. British Military Hospital, Malta, for permission to publish this observation.

F. KRONENBERGER.

1. Shafar, J., Garber, J. *Lancet*, 1947, ii, 279.
2. Ockuly, E. A., Barnhart, W. T., Egbert, H. L. *J. Amer. med. Ass.* 1945, **129**, 274.

HEALTH SERVICES ACT IN NORTHERN IRELAND

SIR,—As there appears to be some misconception concerning the provisions of the Northern Ireland Health Services Act in respect of the sale of medical practices, may I through your columns make it clear that the Act contains, in section 7, the same prohibition as the English Act against the sale of medical practices on the part of doctors who take service under the scheme? The Act also contains provisions for the compensation of doctors who come into the scheme on the appointed day and thus lose the right to sell the goodwill of their practices. These provisions have been inserted in agreement with the representatives of the medical profession in Northern Ireland, the negotiations having been conducted with the Northern Ireland branch of the British Medical Association.

Ulster Office,
13, Regent Street, London, S.W.1. W. BROOKE PURDON.

IMBALANCE OF VITAMINS

SIR,—The article by Professor Davidson and Dr. Girdwood on March 6 will certainly be a milestone in our knowledge of the nutritional causes underlying neurological lesions. They suggest "that purified parenteral liver extracts may contain a substance which enhances the absorption or utilisation or facilitates the liberation from an inactive state of various members of the vitamin-B complex." Having previously described cases of vitamin imbalance,[1] and having since seen a few more definite cases, I may perhaps be permitted to comment on this question.

Davidson and Girdwood rightly argue that the pronounced rise in incidence of involvement of the central nervous system, and especially the rapidity of onset and intensity of symptoms in cases of pernicious anæmia treated with folic acid alone, support their assumption that folic acid exerts an antagonistic action on other members of the vitamin-B group. In support they quote Ross et al.[2] who observed posterolateral cord lesions in 11 out of 21 cases of pernicious anæmia treated with folic acid; the cord lesions developed mainly in the patients receiving larger doses and progressed during treatment with folic acid.

In the light of recent investigations the understanding of nutritional imbalance becomes more and more difficult. Woolley [3] has recently discovered a series of relationships between chemical structure and biological activity and shown that quite small structural changes may be of the greatest importance—e.g., the changing of a carboxyl group into another acid group may convert metabolites into inhibitors. On the other hand, it is often nearly impossible to distinguish between an intoxication and a deficiency—e.g., in "canine hysteria." [4] Again, of the 97 cases of Spies et al.,[5] of which at least 23 had pernicious anæmia [6] and which were all treated with comparatively large doses of folic acid, not one developed signs of vitamin-B deficiency although most were kept on a strict diet devoid of meat and fish products; but 4 cases of pernicious anæmia developed cord symptoms.[7]

1. Leitner, Z. A. *Lancet*, 1943, ii, 474; *Brit. med. J.* 1945, i, 609.
2. Ross, J. F., Belding, H., Paegel, B. L. *Blood*, 1948, 3, 68.
3. Woolley, D. W. *J. biol. Chem.* 1946, **162**, 383.
4. Mellanby, E. *Brit. med. J.* 1947, ii, 288. Moran, T. *Lancet*, 1947, i, 289.
5. Spies, T. D., Lopez, G. G., Stone, R. E., Milanes, F., Toca, R. L., Aramburu, T. *Lancet*, Feb. 14, p. 239.
6. Spies, T. D., Lopez, G. G., Milanes, F., Stone, R. E., Brandenburg, R. O., Aramburu, T. *Z. Vitaminforsch.* 1947, **19**, 1.
7. Spies, T. D., Stone, R. E. *Lancet*, 1947, i, 174.

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Contrary to expectations the rigid dietary control devised by Spies and his associates to assure a controlled experiment appears to have been at least partially instrumental in avoiding adverse reactions to folic acid. This assumption is corroborated by some recent investigations which seem to indicate that a slightly altered physiology may largely modify the interrelationships between various nutrients; this may follow seemingly innocuous modifications of such factors as the kind and amount of amino-acids in certain proteins, the qualitative and quantitative change in fats and fatty acids, and the type of carbohydrate in the diet.[8]

Patients with advanced deficiency diseases appear to have a gross disturbance of certain complex biochemical systems, for instance in conditioned deficiency states. In many pathological conditions, however, imbalances are present which cannot be explained by the simple omission or substitution of one single specific substance. In such circumstances the disturbance may be brought about by a relatively massive dose of one single vitamin (i.e., one single enzyme system), which may upset the coördination of the whole complicated system or perhaps may exert an inhibitory effect on other enzyme groups which at that particular moment are present in abnormally low amounts. Could not the functions of folic acid be considered as those of a single enzyme system? Potent liver extracts, on the other hand, contain several such enzyme systems which are apparently well balanced. If therefore folic acid alone is given in relatively large amounts, it appears possible that the coördinated action needed for a complex enzyme system becomes deranged in such a way that while there is a striking influence on the megaloblastic bone-marrow and on the sprue syndrome, no effect, or even an adverse effect, is produced on the cord lesions. Indeed, Davidson and Girdwood particularly emphasise that the concomitant development of the hæmatological and neurological features of pernicious anæmia is caused by a deficiency of several factors—a fact which has not always been appreciated in recent years. Further work along these lines may prove useful.

London, W.1. Z. A. LEITNER.

NEONATAL DIARRHŒA AND PERITONITIS

SIR,—In a recent number of an American journal[9] 3 deaths from peritonitis associated with neonatal diarrhœa are reported; the author adds that only 1 previous case has appeared in the literature. This prompts me to report the following case.

A male infant, of 9 weeks, was admitted to Plaistow Fever Hospital on Jan. 5, suffering from gastro-enteritis. His illness had started three days previously. The findings on admission were mainly negative; the ear-drums were rather red, there were a few râles in the lungs, and dehydration was slight. He made good progress, gaining 16 oz., up till Jan. 22; but that day he had a temperature of 101°F. The next day he vomited repeatedly, and at 6.30 P.M. he collapsed, with severe abdominal distension. The last stool was passed at 3 P.M., and thereafter no peristalsis was heard. He was transferred to Whipps Cross Hospital that night.

Arrived there, a straight X-ray film of the abdomen showed some fluid in moderately distended coils of small gut. Laparotomy was performed by Mr. D. Lang Stevenson; he found much viscid glairy fluid in the peritoneum, but no primary focus; this fluid yielded on anaerobic culture a profuse pure growth of a hæmolytic streptococcus. The baby died some six hours later. Autopsy was carried out by Dr. Keith Simpson, who reported as follows: "The intestines were normal except for generalised dilatation as from peritonitis, and some looseness without actual inflammation of the bowel lining; an acute general peritonitis of several days' duration, without primary cause; severe toxic changes in the myocardium, and to a less extent in the kidneys and liver."

I am indebted to my colleagues in the two hospitals named for their ready collaboration in preparing this report.

Whipps Cross Hospital, London, E.11. E. HINDEN.

8. Leitner, Z. A. *Med. Pr.* 1948, **219**, 215.
9. Doenges, J. P. *J. Pediat.* 1947, **31**, 669.

ARSENICAL ENCEPHALITIS TREATED WITH BAL

SIR,—In the following case encephalitis due to arsenic responded remarkably to treatment with BAL.

An Indian seaman, aged 40, who had had a primary syphilitic sore three months previously, was found on Oct. 23 to have a strongly positive blood Kahn reaction; there was no history of secondary manifestations. The first injection of neoarsphenamine was given on Oct. 25 and the second on Nov. 15. Six hours after this second injection the patient was admitted to hospital, semiconscious, uncoöperative, restless, and sometimes violent. On examination of the central nervous system, no abnormal signs were elicited; lumbar puncture could not be performed. Soon after admission treatment with 5% BAL—2 ml. intramuscularly every four hours—was begun. After the fourth injection the patient regained consciousness and began to talk sensibly. Treatment with BAL was continued in accordance with the Medical Research Council's scheme of dosage for arsenical dermatitis; and on the 7th day the patient was discharged fit for work and with no abnormal signs in the nervous system.

My thanks are due to the Director of Medical Services, Aden, for permission to publish this case.

Civil Hospital, Aden. N. R. GUPTA.

TRANSFORMING THE HOSPITAL

SIR,—I have read with great interest the articles on hospitals which have lately appeared in THE LANCET.

The architect concerned in the planning of hospitals must nowadays watch his step or he will find that his building is soon out of date. Most of the big new hospitals in this country and abroad are no sooner completed than they are subjected to a barrage of criticism in which all their faults are exposed. It is quite clear that no building can ever be perfect but there is evidently something a bit wrong with our methods.

The time-lag forced upon us by post-war conditions might well be spent, as your leading article on March 6 suggests, in carefully reviewing the situation.

One school of thought holds that since medical science is advancing so rapidly hospitals should be in temporary buildings to be burned down every 20 years or so. This means that single-story hospitals such as we had for the Forces in the war, though perhaps with a rather better finish, would be the rule. At the end of 20 years another series of temporary hospitals would be erected on the same assumption, and so on to the end of time, for we cannot expect medical science to stay still to oblige us. This, surely, is a case of *reductio ad absurdum*.

The alternative is to erect buildings of not too elaborate a structure with a flexible plan. This is, of course, not easy; but much can be done by incorporating beams and stanchions of standard dimensions, by making internal walls non-weight-bearing, and so on. Moreover, it would be worth while to consider which features have come to stay and which should be discarded. For instance, the "sanitary tower" has definitely gone for ever, and the side-lighted ward with parallel beds has largely superseded the cross-lighted, cross-ventilated ward with beds at right-angles to external walls. The plan which is becoming most usual shows patients' rooms on one side of a central corridor and ancillary rooms on the other; this is all right if the corridor has "light bays" at intervals since the wards need some cross-ventilation through the corridors in hot weather. All plumbing should be arranged so that the interior of the building is free for alterations later on.

Perhaps the most important question for the planners to decide is whether the self-contained unit of 20 to 25 beds is to remain the standard. This arrangement, which has always been the glory of the English hospital system, has been based on requirements for good nursing. If, however, we adopt the Continental system of arranging wards, like hotel bedrooms, in continuous line without any marked division, the plan of the hospital will be profoundly modified. It is for the leaders of the medical and nursing professions together with the hospital administrators (these are most important, for they hold the balance between the other two) to give the architect the lead on such points as these. The size of the hospital is also a question of vital importance. In the special case of the teaching hospitals, though a large number

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of beds is required, there is a growing opinion in favour of much smaller institutions and greater decentralisation.

In conclusion, I feel that planning has lately become too technical and functional, with the result that the human factor has been unconsciously neglected. More than once a hospital planned by first-class experts has somehow failed to give satisfaction to either patients or staff. Efficiency is necessary, but it is evidently not enough in itself to ensure success. There are many other points, such as the size of windows, the height of wards, and heating and ventilation, which might well be made the subject of careful study for the guidance of future hospital builders. The keynote of such an investigation should be simplicity and economy not only in capital cost but in maintenance.

London, W.C.1. L. G. PEARSON.

APPLIED PHOTOGRAPHY

SIR,—The article on applied photography by Dr. Hansell and Dr. Ollerenshaw (Nov. 1) is timely and of great interest. This is a subject in which I am particularly interested and of which I have had some experience.

The tendency to regard photography merely as an additional department of the hospital is wrong, and this is rightly stressed. However, I was rather surprised to see that the authors advocated a photographic section separate from the museum. Surely the time has now come when the various hospital museums should be reorganised in the light of modern experience. Instead of consisting of a collection of pathological specimens in bottles, they should be classified into sections each covering one disease or a group of diseases. Each section should have details of symptoms, diagnosis, and treatment, and should also include pathological specimens, wherever possible supplemented by photographs. This principle is followed in the museums of the Wellcome Research Institution and the London School of Hygiene and Tropical Medicine, both of which are outstandingly good. A museum can best help the student by a graphic display of diseases.

Unlike these authors, I consider that the normal lantern-size transparency is the ideal medium for displaying radiograms and colour work; the miniature size is too small unless it is shown through a lantern.

I was disappointed to see no reference to stereoscopic photography, which is useful in all kinds of medical work and illustrates certain diseases much better than the straight photograph. Other points were not included. A photograph coloured in oils by an expert is reasonably permanent and should be part of the work of the photographic department. Line drawings from photographs can be made easily and accurately and the irrelevant parts faded out.

Photography is such a valuable aid for teaching, record work, and routine use that it would be a great pity if it was to start as a separate entity rather than as a universal aid to every department of the hospital.

Malakal, Sudan. J. F. E. BLOSS.

SUFFOCATION BY MILK FEEDS

SIR,—To support the evidence of Professor Polson and Dr. Price in their letter on Feb. 28, we present a few figures culled from our post-mortem findings in this department during the past six months.

In this period 7 babies under the age of six months were found to have died from the effects of inhalation of vomited milk. Of these, 4 were the subjects of coroners' inquiries, because the infants had been found dead in their cots or prams. In each of these cases vomited milk had been seen on the pillows, and autopsy revealed the presence of milk in the trachea, bronchi, and lungs; and early bronchopneumonia had developed in 2. The other 3 infants died in hospital; in 1, death was undoubtedly due to asphyxia, for the right main bronchus was completely blocked by vomit, but in the other 2, although vomited milk was present in the air passages, a definite bronchopneumonia had developed, pus as well as milk being expressible from the cut surface of the lungs.

The points to which we would draw attention are:

1. Although suffocation from inhaled vomit may cause sudden death in infants, inhalation of small quantities of milk may give rise to aspiration bronchopneumonia. Deaths may then be certified as due to "bronchopneumonia" without the essential cause being recognised.

2. The pernicious practice of "pinioning" babies in their cots or prams by wrapping blankets or shawls firmly round their chests and tucking the blankets well into the sides of the cot or pram to keep them "quiet" or "tidy" is certainly responsible for some of these deaths. The unfortunate infants are unable to expand their chests to breathe properly or to eject vomited milk from their mouths effectively; and when some milk trickles into the trachea they are unable to cough it up. Definite evidence on this point was found in 2 of our cases.

3. We agree with Polson and Price that infants are often given bottle-feeds whilst lying down, and that this practice predisposes to suffocation.

4. Education of mothers, nurses, and others in charge of young infants should be specially directed towards teaching the correct method of tending, feeding, and "bedding." A decrease in these preventable deaths would surely follow.

5. The claims of extraneous interests should be subordinated to those of motherhood.

Department of Pathology, General Hospital, Northampton. R. M. HEGGIE RUBY O. STERN.

LESIONS OF CERVICAL INTERVERTEBRAL DISCS

SIR,—In the discussion at the Royal Society of Medicine, reported in your issue of March 13, only a fleeting reference was made by one speaker to treatment by manipulation. During the last eighteen months I have seen 15 patients presenting unequivocal evidence of the monoradicular type of cervical disc prolapse, and 6 of these were suffering from severe pain which persisted for more than a few weeks. These were treated by manipulation of the neck under thiopentone anæsthesia; 5 made an immediate and dramatic recovery, and the sixth patient was quite unaffected; her symptoms were abolished by skull traction over a period of seventy-two hours. These results justify my previous advocacy of manipulation[1] as safe and effective.

Manipulation is not indicated for paræsthesiæ alone, however troublesome, but only for pain, and two or three weeks should be allowed for the chance of spontaneous recovery with palliative management. Recently two surgical colleagues consulted me. One had distressingly severe pain, but this cleared up after ten days; the other has recurrent paræsthesiæ without pain, but though these are a serious nuisance, and though there are all the objective neurological and radiological features of disc prolapse, one must be content in this type of case to recognise the lesion and to make a mental reservation in favour of manipulation should severe pain supervene, for premature manipulation might well provoke an attack. There is of course the fear of producing cord symptoms, but this appears groundless in purely monoradicular syndromes, and my use of the method is based on the personal knowledge of large numbers of manipulations performed by different surgeons in past years for cases then diagnosed as cervical arthritis with referred pain, cases which it is now clear included many instances of disc prolapse. I do not know of a single patient in whom cord symptoms appeared following manipulation, while the frequency of improvement was gratifying.

Ultimate recurrence is likely, and indeed probable with this treatment, but that is no real deterrent, for the therapeutic problem in these cases is essentially a short-term one, with the patient needing to be helped over acute episodes as they arise. Nevertheless, the period of remission after manipulation of the cervical spine is a good deal longer than occurs after manipulation for lumbar prolapses, while the likelihood of relief is much greater.

As regards the relative frequency of the different causes of brachial neuralgia, during the same period of eighteen months I collected from the same clinics only 12 patients with well-marked thoracic-outlet or first-rib syndromes of all kinds, so that cases of disc prolapse were slightly more common.

Finally, on a point of terminology, I note that Dr. Russell Brain uses the expression "costoclavicular syndromes" to include all thoracic-outlet disorders

1. *Proc. R. Soc. Med.* 1947, **40**, 496.

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affecting the brachial plexus on its way to the arm. I suggest that "costoclavicular" should be restricted to the specific condition which the name implies, and for which it was employed by Falconer and Weddell—compression of the plexus and possibly the subclavian vessels between first rib and clavicle.

London, W.1. DAVID LE VAY.

Parliament

FROM THE PRESS GALLERY

United Services

SPEAKING in the debate on the Army Estimates in the House of Commons on March 9, Dr. HADEN GUEST stressed the additional responsibilities which the war of the future would lay on the Army to reinforce civil-defence services. The atom bomb, bacteriological warfare, and new forms of chemical warfare could attack and destroy large communities. The atom bomb, he continued, was costly, but bacteriological warfare was cheap, and the resources of a good county public-health laboratory were sufficient for the manufacture of the deadliest germ weapons. In any future war there must therefore be greater integration between the military and civil sides of the nation's life, and the greatest economy in the use of scientific and technical personnel.

The problem as it applied to the medical officers in the Services was an example of the difficulties to be faced. There was great difficulty in supplying the full quota of medical specialists to the Army, and a lesser difficulty in the other Services, because medical officers of an age liable to be called up had not had time to take the highest specialist qualifications. A man under 30 who was called up could not be expected to be capable of acting as consultant medical officer or surgical medical officer to a division or a command. But it was upon highly placed consultant officers that the efficiency of the medical services would depend. This was a grave difficulty which was increased by the demands made on medical man-power in other fields, notably that of the new National Health Service which would come into operation on July 5. Shortly afterwards there would be a demand for an increase in the number of general practitioners.

Demands were also, quite rightly, being made on medical man-power for the Colonial Service. During and since the war it had been necessary to make an ad-hoc arrangement in West Africa and in another Colony by which medical men who were recruited for what normally would have been military duty had been allocated to service in these Colonies and that service had been accepted in discharge of their military obligations.

The expansion of civil defence, Dr. Guest pointed out, would be another large drain on our medical man-power. Referring to this problem the Minister of Defence had said that the Government had not closed the door to unification of common services within the Forces, but that for the time being he rejected the idea of unification in favour of administrative coördination. Dr. Guest trusted that this coördination among the Services would be carried out immediately. There was no sense in the medical services of the Navy, Army, and Air Force having three different kinds of forms on which to report the same disability; it meant confusion and extra sorting work when the patients got into hospital. The demands of the Services for specialists and administrative officers, he added, could, for the most part, be met only by creating a large number of regular commissions or short-term commissions of five years. But economy was needed and he understood that unification of the medical services of the three Forces would involve a saving of medical personnel of 5–10%. Dr. Guest had seen how the medical services coöperated in Malta, and how they were working together in Hong-Kong. Again, during the war most of the hospitalisation of casualties was carried out by the Army, whether the casualties were from the Navy, the Army, the Air Force, or civilian. Dr. Guest also recalled that our big medical base had been in this country largely in the form of the Emergency Medical Service—a civilian organisation which acted admirably. Unification of the Services, he therefore suggested, should be extended over civilian and industrial medicine, the Defence Services, and Colonial needs, and this single service should include the National Health Service, general and special services, and the Army, Navy, and Air Force, and Colonial Services.

In such a unified medical service, he pointed out, superannuation and pension schemes could be completely interchangeable between one branch and another. There would be no need to tie anyone down to lifelong work in any branch, and some might spend their early years in the Colonies or one of the Services without being handicapped on returning to work at home. Dr. Guest believed that this practical proposal would go a long way to solve our immediate problems, though he recognised it had certain Service objections, partly of a sentimental character.

In his reply to the debate Mr. MICHAEL STEWART, Under-Secretary of State for War, admitted frankly that there was a shortage of specialists. It was extremely difficult, he added, to see any immediate remedy for it. It was part of the general shortage of medical specialists from which the Army was not by any means the only sufferer. It was important, therefore, that we should make the best use of the specialists we had. As Dr. Guest had suggested, it might be possible to obtain further economies by measures of coördination between the medical departments of the three Defence Services. A recently appointed committee was already working on that problem, and Mr. Stewart hoped that it would help to provide a solution.

QUESTION TIME

Pensioners and Treatment Allowances

Mr. J. L. WILLIAMS asked the Minister of Pensions whether he proposed to alter the practice of making a deduction from treatment allowances in respect of sick pay or wages received during a course of treatment.—Mr. ARTHUR BLENKINSOP replied: As from the first pay day in April, the allowances at the 100% pension-rate, which are payable during a course of approved treatment which prevents a pensioner from working, will be paid without any deduction on account of sick pay or wages.

Medical Records and Pension Appeals

Mr. E. G. WILLIS asked the Minister if he would make available to an appellant's doctor, before a case was taken to the tribunal, the medical evidence to be submitted on behalf of the Minister.—Mr. BLENKINSOP replied: Before an appeal is sent to the tribunal the appellant is provided with two copies of a statement containing all the relevant medical and other facts of his case, and is, therefore, in a position to seek the assistance and advice of his doctor on matters contained in the statement. The Minister is, however, prepared to supply to a claimant's doctor, subject to the claimant's written consent, information from the medical records of his department if this is required before an appeal is formally lodged.

Milk Ration Anomaly

Mr. J. B. HYND asked the Minister of Food whether any decision had yet been reached to remove the discrimination whereby mothers purchasing National Dried Milk must surrender the child's liquid-milk ration whereas those purchasing more expensive dried-milk foods need not do so.—Dr. EDITH SUMMERSKILL replied: The Minister is considering this matter but has not yet reached a decision. Mr. HYND: Is the Parliamentary Secretary aware that this matter has been under consideration for a number of months, and that mothers who are being deprived of the liquid-milk ration while others are enjoying it are wondering when they will get the same treatment?—Dr. SUMMERSKILL: I agree, but there is one important point—namely, that we cannot immediately deprive all babies of proprietary foods. We have to make some arrangements to ensure that those mothers who have been buying proprietary foods for their children can continue to do so.

Scholarships

Dr. S. JEGER asked the Minister of Education (1) the number of medical students whose fees were paid wholly, and partly, from public funds; (2) the number at present receiving maintenance grants from public funds.—Mr. G. TOMLINSON replied: At present 2540 grants for medical students from my department are current. Of these, 2509 provide for the

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payment of full fees and a maintenance grant, 6 for a maintenance grant only, 3 for full fees only, and 22 for part fees only. Local education authorities also give grants to medical students, but figures for these are not available.

Alien Doctors

Mr. SOMERVILLE HASTINGS asked the Lord President of the Council if he was aware of the long delay in the issue of registration forms for doctors under the General Practitioners and Pharmacists Act, 1947; and when he anticipated that these forms will be ready for distribution.—Mr. A. BEVAN replied: This is a matter for the General Medical Council and I understand that in the case of the great majority of doctors who have expressed an intention of applying for registration under the Act the necessary forms were dispatched by the end of last month.

Mr. HASTINGS: Does the Minister realise that there are some doctors who have served in our own Forces and who gave valuable services to their country and have been waiting for a year to get employment in this country?—Mr. BEVAN: That question hardly arises out of the original question, because the Act was not passed until Dec. 18 last, and it took some time to get the forms printed. A number of forms was necessary, and the forms are now going out at a considerable rate.

Obituary

EDWARD WAYMOUTH REID

B.A., M.B., SC.D. CAMB., LL.D., F.R.S.

IN 1899 Edward Waymouth Reid, already a distinguished physiologist from Cambridge, at the early age of 27 joined an illustrious group—Peterson, Geddes, Ewing, Carnelly, and Sir D'Arcy Thompson—as one of the professors in the new medical school in University College, Dundee. Even among such men he was eminent, and before long he was appointed dean of the faculty of medicine. By his pioneer work in the growing school he amply justified the choice. From then, until his retiral in 1935, he taught succeeding generations of students what is meant by the scientific outlook, as well as training them in his own subject. The former part of his teaching only those who worked under him can fully appreciate; to the latter, his distinguished students today bear witness. From morning to night, from year to year, his department was the pulsating impulse in the medical school, and the bustle and happiness of all his workers, down to the lab. boy, by unconscious imitation of Waymouth, paid tribute to his influence.

The diversity of his interests shows the breadth and depth of his intellect. Physiologists can tell of the value of his works, but a bare recital of them shows his catholic interests. Perhaps his work on serum absorption, which early earned him fame, is the most important. But the preparation of crystalline hæmoglobin, and the estimation of its molecular weight by osmotic-pressure estimation years and years ago, was equally outstanding. Latterly his work on iron absorption and sugar metabolism produced results which showed that newer techniques and ideas were all familiar to this perpetual student. He mastered photography in the early days of the Lumière colour process. For a time X rays interested him and he made his own X-ray tubes. Bizarre preoccupations, such as the physiology of pigeons' milk, slime secretion in eels, carbon dioxide secretion by frogs' skin, proved him a true scientist, to whom the interest of the means is as important as the interest in the end.

I have called him the perpetual student, and by so being he endeared himself to his students. None who sat under him will ever forget his lectures, devastating in factual knowledge, but relieved by humour. Memories crowd back of the professor at work and play, up at sunrise for days on end while in the country to get the light just scientifically right for a photograph he wanted, making toffee for a students' bazaar with all the advantages that a laboratory and his great knowledge of physical chemistry could endow. A great Englishman and the product of a great generation.

W. G. C.

Prof. E. Waymouth Reid was born at Canterbury in 1862, the son of James Reid, F.R.C.S. From Sutton Valence grammar school he went to Cavendish College and then to Cambridge, where he won an open classical scholarship in 1879. In 1883 he was placed in the first class in the natural sciences tripos with distinction in human anatomy and physiology. He completed his medical education at St. Bartholomew's Hospital, qualifying in 1885, and later he became demonstrator and in 1887 assistant lecturer in physiology at St. Mary's Hospital. In 1904 the University of Cambridge conferred on him the honorary degree of SC.D., and he was elected F.R.S. in 1898. After his retirement he settled in Edinburgh, where he died on March 10.

CHARLES CHRISTOPHER HEYWOOD

M.B. CAMB., M.R.C.P.

Dr. C. C. Heywood, who died at his home at Alderley Edge on March 10, in his 83rd year, came of a family long illustrious in Manchester history for its religious and philanthropic associations.

He was a Harrovian and received his medical education at Cambridge and St. Thomas's Hospital, obtaining the L.S.A. in 1889 and his M.B. the following year. He soon began to specialise in children's medicine, and served his full time as physician to the Manchester Children's Hospital at Pendlebury and in the Salford Royal Hospital. His quiet unostentatious manner fitted him eminently for this work. In 1913 as president of the Clinical Society of Manchester he gave an address on pleural effusion in children, a subject in which he was especially interested.

Himself the fourth son of Canon H. R. Heywood, of Swinton, he had many connexions with the Church and with education, being brother to the Right Rev. B. O. F. Heywood, the retired Bishop of Ely, and father of the Very Rev. H. C. L. Heywood, once Dean of Caius College, Cambridge, and now Provost of Southwell Cathedral, while a nephew, Mr. F. M. Heywood, is Master of Marlborough College. Like so many of his family Chris Heywood was attached to various philanthropic institutions. He was one of the feoffees, or governors, of the Chetham's Hospital, a school for poor boys founded in 1656, and to this institution he was also consulting physician. He married a daughter of Captain P. R. Lempriere, and she survives him with four sons and two daughters. Their golden wedding was celebrated in 1943.

Public Health

Pamphlet on Vaccination

A MEMORANDUM on the indications and technique of vaccination against smallpox has been composed by the Ministry of Health with the help of various experts.[1] In it the multiple-pressure technique is advocated. For primary vaccination of infants:

> "A drop of vaccine lymph covering an area about one-eighth of an inch in diameter is placed on the skin at the prepared site, usually in the region of the deltoid insertion on the left arm. A straight needle which should be flat sided or triangular in section (e.g., an Hagedorn) and of relatively large size, in good condition, sharp and sterile is held parallel or tangential to the arm with the forefinger and middle finger above and the thumb below. One side of the needle point is then pressed firmly and rapidly into the drop about 30 times within ten seconds, the needle being lifted clear of the skin each time. This rapid up and down motion of the needle is in a plane perpendicular to the skin."

For primary vaccination later than infancy the number of "pressures" can be reduced to 10 or less when there is no urgency, while for revaccination 30 pressures are suggested. On the other hand, in the primary vaccination or revaccination of children or adults exposed to immediate risk of smallpox, there should be two areas of insertion with 30 pressures on each.

Among the advantages claimed for the multiple-pressure technique are that it causes little pain or trauma and is less likely than other methods to give rise to severe local reactions or septic complications.

1. Memorandum on Vaccination Against Smallpox. H.M. Stationery Office. 1948. Pp. 8. 2d.

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Notes and News

A PUBLIC MEGAPHONE

SPEAKING last week at the annual meeting of the Institute of Almoners Mr. Aneurin Bevan, the Minister of Health, said that when the National Health Service began a situation would arise in which echoes would reverberate through Whitehall every time a maid kicked over a bucket in a hospital ward. For a while there would be a cacophony of complaints. According to a *Times* report (March 13) he continued: "For a while it may appear that everything is going wrong. As a matter of fact, everything will be going right, because people will be able to complain. They complain now, but no one hears about it. What will happen about July 5 is that a public megaphone will be put in the mouth of every complainant, so that he can be heard all over the country." It was hopeless to expect that such a big service could be started without a good deal of controversy and question. But it would start, and it would be watched by almost every nation in the world. Alterations and adjustments would be needed, "but we are just the people to make them, because we are not ridden with doctrine but are visionary empiricists—a people able to adjust ourselves."

REPRESENTATION OF HOSPITAL OFFICERS

ON Feb. 28 we published extracts from a letter from representatives of ten trade unions protesting against the formation of the new National Federation of Hospital Officers. Mr. C. C. Carus-Wilson, as general secretary of the federation, states that it was started "because a very considerable number of hospital officers feel that what is most needed under the new Health Service is a trade union which shall be non-political and shall devote the whole of its activities to the interests of hospital officers and the hospital service." It is, he says, erroneous to suppose that the Ministry of Health is opposed to the setting up of this new body, and would not recognise it. "There are thousands of hospital officers who are not eligible for membership of a professional association, and if they are to secure representation on the functional councils of the Whitley machinery, they would have to rely on one or other of the political trades unions, or on a body which does not devote the whole of its energies entirely to the hospital service."

The three main aims of the federation are (1) to protect the interests of hospital officers in the negotiations on salaries and conditions of service; (2) to ensure that the hospital service of the future shall be the best service possible; and (3) to take all such steps as may be necessary to secure the maximum care and well-being of the patients. "The tremendous response throughout the country to the federation is a clear indication that hospital officers generally do not feel that any protest from any quarter is justified."

SICK-BAYS IN CIVIL LIFE

PLANS for increasing the nursing force must at present run parallel with schemes for economising their services, and reducing the calls on hospital beds. Dr. Noel Pearson, in a letter to the *Medical Officer* of Feb. 7, points out that under the National Health Service there will be an increased demand both for hospital beds and for home nursing which it will be impossible to meet for years to come. He suggests that things could be eased by providing sick-bays on the lines of the camp reception stations. They would be used for the observation and treatment of patients with minor medical and surgical conditions who have no-one to look after them at home, but who do not need skilled nursing or specialist care. These sick-bays could be set up in existing houses, and staffed with full-time or part-time nursing auxiliaries, thus making no call on the pool of registered nurses. Local authorities established such sick-bays for children in the reception areas during the war years, and in Dr. Pearson's opinion the regional hospital boards might well do the same for people of all ages.

WHITAKERS

THIS year, like the fine weather, Whitaker's Almanack has appeared early, and as usual it provides a reliable and up-to-date guide to our dizzy world. There have been gains and losses, and this 80th volume[1] records impartially the dissolution of the Indian Empire and the creation of the new agencies of the United Nations. At home the march of social legislation is shown by an explanatory review of the new National Insurance system, and the enlargement of the educational section. Presumably as reminders of the more stable features of our life and of the past, daily metereological observations and the names of the chiefs of the Scottish clans have been included this year.

1. London: J. Whitaker & Sons. 1948. Pp. 1092. 12*s*. 6*d*.

University of Oxford

In a congregation on Feb. 28 the degree of bachelor of medicine was conferred on John Bevan.

University of Dublin

On March 10 at the school of physic, Trinity College, the following degrees were conferred:

M.B., B.Ch., B.A.O.—W. B. Alcott, Brenda M. Charles, J. F. Connolly, Sheila Davies, G. W. Keating, J. D. Keatley, J. W. McCaw, Kennedy McIntyre, C. M. Marcus, D. J. J. Waugh.

Royal College of Surgeons of England

At a meeting of the council of the college held on March 11, with Sir Alfred Webb-Johnson, the president, in the chair, Mr. C. Gill-Carey, Mr. T. P. McMurray, and Mr. S. A. S. Malkin were elected to the fellowship. Dr. A. D. Marston was elected the first dean of the faculty of anæsthetists in the college. A Hunterian professorship was awarded to Dr. Shafik Shalaby, of Cairo.

Diplomas of fellowship were granted to the following:

G. R. C. Peatfield, A. D. Messent, C. McK. Craig, P. J. Blaxland, H. H. Renyard, N. S. Slater, D. H. G. Walker, N. W. Gill, G. M. Lunn, J. H. Tasker, W. A. Hamer, R. N. Jones, A. E. Wall, A. J. H. Rains, A. G. Ellerker, William Waugh, S. S. Bassi, L. D. C. Austin, H. A. Oatley, N. A. A. Cust, A. N. H. Peach, E. K. Gardiner, L. C. McCarthy, F. W. Taylor, J. A. Aylwin, E. O. Dawson, D. W. Fleming, M. E. Hall, R. G. R. Langford, J. M. Sanderson, A. R. Wakefield, Harold Bolton, D. B. Duffy, V. G. Walker, R. B. Welbourn, P. R. Wright, J. W. F. Macky, A. V. Pollock, A. L. El-Bedri, U. D. Nagarkatti, P. H. Jones.

A diploma of membership was granted to Somnath Basu, and a diploma in public health, jointly with the Royal College of Physicians, to A. W. Mearns.

Scottish Conjoint Board

Having passed the final examination the following candidates have been admitted licentiates of the Royal Colleges of Physicians and Surgeons of Edinburgh, and the Royal Faculty of Physicians and Surgeons of Glasgow:

G. G. Allan, S. I. Arondse, A. J. Barr, Mary H. Bruce, Gilbert Cameron-Mowat, Margaret G. R. Davidson, Mary A. Hamilton, G. J. C. Herd, Seymour Hopfan, Nora A. Howie, Paul Katz, Carl Kopet, J. T. Lees, J. D. C. Lyons, John McCulloch, Ian McLeod-Baikie, Mary C. MacRae, Jeanne G. Marshall, Rosabelle J. B. Purves, Catherine J. A. Robertson, S. S. Ross, J. N. Shea, J. B. Thompson, J. E. H. Tullis, W. F. Watson, Harold Weiss, Bertram Winocour.

Institute of Laryngology and Otology

On Saturday, May 8, at 11 A.M., at the institute, 330, Gray's Inn Road, London, W.C.1, Dr. Julius Lempert of New York will lecture on his fenestration operation.

British Pharmacopœia, 1948

The new edition of the *British Pharmacopœia*, to be published shortly, will take effect from Sept. 1. From April 19 advance copies may be inspected at the London headquarters and branch offices of the General Medical Council.

A Medicolegal Congress

The 24th Congress of Legal, Social, and Industrial Medicine will be held at Lausanne, from May 21 to 23, under the presidency of Prof. Paul Reinbold. Further information may be had from the secretary-general, Prof. M. Muller, 14, Avenue Friedland, Lille, France.

Helicopter as Ambulance

From Sweden comes the story of an accident case taken direct to the hospital door by helicopter. This was flying over the Stockholm archipelago when the pilot saw some people waving from one of the frozen bays. On landing, he found that an angler had had a head injury and was lying unconscious and stiff with cold. Taking the patient aboard in place of his passenger, whom he left behind, the pilot took off and landed in front of the Southern Hospital, which had been warned by radio of his coming.

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Auxiliary R.A.M.C. Funds

The annual general meeting of the members of the Funds will be held at 11, Chandos Street, London, W.1, on Monday, April 5, at 5.30 P.M.

International Society of Hæmatology

This society's biannual meeting is to be held at Buffalo, New York, from Aug. 23 to 26. Communications and applications for membership from those in the United Kingdom should be addressed to Dr. R. R. Race, Lister Institute, Chelsea Bridge Road, London, S.W.1.

Demonstration of Contraceptive Technique

On Thursday, April 1, at 2.30 P.M., a demonstration of the technique of the use of different contraceptive methods will be given at the Mothers' Clinic by Mrs. Marie Stopes, D.SC., and Dr. Beddow Bayly. Tickets may be had in advance from the clinic, 108, Whitfield Street, London, W.1.

Mental After Care Association

The annual meeting of the association will be held at Burlington House, Piccadilly, London, W.1, on Monday, March 22, at 4 P.M., when Mr. Justice Birkett, P.C., will speak. Dr. Henry Yellowlees, chairman of the association, will present the annual report.

Foot Health Educational Bureau

At a conference on the Foot and the Shoe which the bureau is holding at the Caxton Hall, Westminster, S.W.1, Mr. T. T. Stamm, F.R.C.S., will give a lecture on Friday, May 7, at 2 P.M. Tickets may be had on application to the bureau, 90, Ebury Street, S.W.1, before April 27.

Return to Practice

The Central Medical War Committee announces that Mr. Stewart Feggetter, M.S., F.R.C.S., has resumed civilian practice at 4, Brandling Park, Newcastle-upon-Tyne.

Royal Sanitary Institute

On Thursday, April 1, at the Guildhall, Northampton, Dr. C. M. Smith will read a paper on Control of Infection in Day Nurseries. Other meetings to be held in April include sessions at Hove, on April 10, when Dr. N. E. Chadwick will speak on the Sterilisation of Sea-water Baths, and in London, on April 14, when the speakers in a symposium by members of the L.C.C. staff on the Hygiene of the Preparation, Storage, and Distribution of Food will include Dr. J. E. McCartney.

Medical Society of London

Speaking at the 168th anniversary dinner on March 11, the Marquess of Reading coined a new noun of assembly —a "plebiscite of doctors." His various attempts to translate the society's inscription *Saluti Augustæ* included You are Safe in August—that being the time when doctors were on holiday. He looked forward to the president joining the peerage under the title of Baron Gallstones of Guy's. Mr. W. E. Tanner, in reply, spoke well of the society—founded in 1773 and the oldest in England. He appeared less enthusiastic about the National Health Service Act, which, viewed in the perspective of medicine, was something unimportant, a mere fever with hallucinations and delusions of grandeur. The Act was all paper. "It is for doctors to build this thing into something that counts. Having shown what we can do as a profession in the fight for freedom, the people we shan't forget are the British public." Mr. George Armitage, in hospitably proposing The Guests, remarked that doctors had had a very busy life and had not had time to dabble in politics, but they would have to do more in that line in the future. Sir Alfred Webb-Johnson, P.R.C.S., responding, said that we were living in times when the freedom of the professions was in danger, and quoted Sidney Webb's belief that one of the most valuable characteristics of the professions was their independence, which in Britain (said Webb) was secured by the professional man being paid not by salary but by fees from a variety of clients. Sir Alfred felt that there was danger from extremists both to Right and Left. But he recalled the saying that the councils to which history was not called, history would not ratify, and he was confident that the common sense of the people and of Parliament would correct things in the end.

Diary of the Week

MARCH 21 TO 27

Monday, 22nd

ROYAL COLLEGE OF SURGEONS, Lincolns Inn Fields, W.C.2
5 P.M. Sir Reginald Watson-Jones: Fractures of the Spine.

Tuesday, 23rd

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1
5 P.M. Sir Lionel Whitby: The Leucoses.
ROYAL COLLEGE OF SURGEONS
3.45 P.M. Mr. R. J. Last: The Kidneys. (Arnott demonstration.)
5 P.M. Mr. M. F. Nicholls: Surgery of the Urethra and Bladder.
INSTITUTE OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. R. M. B. MacKenna: Principles and Practice of Treatment.

Wednesday, 24th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Mr. Last: The Pectoral Girdle. (Arnott demonstration.)
5 P.M. Mr. A. Hedley Whyte: Surgery of the Rectum.

Thursday, 25th

ROYAL COLLEGE OF PHYSICIANS
5 P.M. Dr. J. St. C. Elkington: Medical Aspects of Cerebral Tumour. (Second lecture.)
ROYAL COLLEGE OF SURGEONS
3.45 P.M. Mr. Last: The Knee-joint.
5 P.M. Mr. T. Twistington Higgins: Urinary Obstruction in Childhood.
MEDICO-LEGAL SOCIETY
8.15 P.M. (26, Portland Place, W.1.) Dr. P. H. Sandifer: Social and Medicolegal Problems of the Psychopath.

Appointments

ROBERTSON, A. M., M.B. Glasg.: M.O., Malaya, Colonial Service.
Chester Royal Infirmary:
DAVIES, H. M., M.D., M.CHIR. Camb., F.R.C.S.: consultant in thoracic surgery.
DAVIES, J. H. T., M.A., M.B. Camb.: visiting consultant dermatologist.
KERR, A. S., M.B. Lpool, F.R.C.S.: consultant in neurosurgery.
KILOH, G. A., M.D. Lond., M.R.C.P.: visiting consultant physician.

Births, Marriages, and Deaths

BIRTHS

CONWAY.—On March 4, the wife of Dr. D. J. Conway—a daughter.
LUCAS.—On March 8, in Cyprus, the wife of Dr. P. F. Lucas—a daughter.
MATTHEWS.—On March 4, in London, the wife of Mr. David Matthews, F.R.C.S.—a son.
OSBORNE.—On March 5, the wife of Dr. John Osborne—a son.
RAYMOND.—On March 7, in London, the wife of Dr. Michael Raymond—a daughter.
THOMAS.—On March 5, in London, the wife of Dr. C. C. Thomas—twin sons.

MARRIAGES

CALVEY—BEVAN.—On March 6, at Maidstone, Harold C. Calvey, M.B., to Margaret E. Bevan.
FRIEDLANDER—SMITH.—On March 6, at Bristol, Peter Friedlander, M.B., to Margaret Napier Smith.
JORDAN—HARPER.—On March 6, at St. Just-in-Roseland, Cornwall, John Jordan, M.B., to Margaret Tuer Harper.
PARKER—DAVIES.—On Feb. 28, at Speen, Berks, William Shepherd Parker, M.B., to Margaret Beryl Davies, M.B.
STREET—WILSON.—On March 6, in Birmingham, Peter Street to Helen Wilson, M.B.

DEATHS

HEYWOOD.—On March 10, at Alderley Edge, Charles Christopher Heywood, M.A., M.B. Camb., M.R.C.P., aged 82.
REID.—On March 10, at Edinburgh, Edward Waymouth Reid, B.A., SC.D., M.B. Camb., LL.D. St. And., F.R.S., aged 85.
STOLTERFOTH.—On March 6, at Burghclere, Berks, Charles Sigismund Stolterfoth, M.R.C.S.
TURLE.—On March 6, at Bexhill, James Evan Turle, M.R.C.S., aged 70.

Dr. E. A. Carmichael, director of the neurological unit of the Medical Research Council, at the National Hospital, Queen Square, is visiting Poland, Czechoslovakia, and Austria, to lecture on behalf of the British Council.

A quarterly *Revista Brasileira de Cancerologia* began publication last September, with English summaries of the more important articles. It is the official organ of the Serviço Nacional de Câncer, Rua Mariz e Barros 775, Rio de Janeiro, and the first issue, well printed and profusely illustrated, deals with the diagnosis and treatment of cancers of the breast, of the abdominal wall in relation to pregnancy, and of different parts of the skin.

CORRIGENDUM.—Prof. J. R. Squire, whose appointment to the chair of experimental pathology in Birmingham University we announced on Feb. 28, was a scholar of Trinity College, Cambridge (not Caius College).

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TREATMENT OF RHEUMATOID ARTHRITIS *

W. S. TEGNER
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ONE still hears dogmatic statements that rheumatoid arthritis is a manifestation of allergy to tuberculous infection or a manifestation of endocrine disorder, but most of those who have made a long study of the disease feel that the more they see of it the more baffling are its ætiology, prognosis, and treatment. The problem is aggravated by the fact that it is not known whether rheumatoid arthritis is a single entity or a group of closely linked conditions presenting similar clinical pictures.

Perhaps the most widely accepted theory is that rheumatoid arthritis is a manifestation of infection. But some incriminate focal infection, others infection by the hæmolytic streptococcus, and still others specific infection by an undiscovered virus. None of the theories of specific infection satisfactorily explains all cases; thus, though many show a high titre of serum agglutinins to the hæmolytic streptococcus there are always others with a low titre. Any discussion of rheumatoid arthritis and the hæmolytic streptococcus raises the question of its relationship to rheumatic fever, which behaves so differently and yet presents many similar problems. Coburn (1945) suggested that, in rheumatic fever, infection by the hæmolytic streptococcus is followed by a defective antigen-antibody mechanism in which the products of antigen-antibody interaction are themselves harmful to the host's tissues and cause the characteristic changes. Kersley (1947) has argued that such a type of sensitivity is responsible for the rheumatoid as well as the rheumatic states.

I have always thought that in rheumatoid arthritis the picture has been unduly obscured by the condition of the joints. Because of our ignorance of the fundamental ætiology of rheumatoid arthritis we have had to treat the effect—the chronic arthritis—rather than the cause. Gibson et al. (1946) in this country have confirmed the findings of American workers that extra-articular pathological changes are to be found in rheumatoid arthritis, consisting of perivascular cellular reactions in muscle and paravascular reactions in connective tissue. Now we know that lymphocytic infiltration in relation to the blood-vessels occurs in periarteritis nodosa and lupus erythematosus, which are described in *Diseases of the Skin* (Sequeira et al. 1947) as "sensitisation phenomena." And the treatment advocated for lupus erythematosus includes the use of gold salts and pyrexial doses of T.A.B. vaccine, which recall some of the treatments advocated for rheumatoid arthritis.

Can there not be some common factor initiating these various syndromes, such as the harmful product of a disordered immunological process, which means that whenever reinfection takes place we have what is known as a recurrence in rheumatic fever and a relapse in rheumatoid arthritis? It may be such factors as age, sex, physical condition of the host, and nature of the infecting organism which determine what type of disease is produced and—to speculate in an even narrower field—what type of rheumatoid arthritis results. I therefore suggest that one can regard rheumatoid arthritis as a condition in which harmful products resulting from a disorganised defence mechanism cause widespread damage throughout the tissues of the body, especially in the joints.

It may be significant that in my department we are seeing an increasing proportion of patients with a recent onset of rheumatoid arthritis who are past middle age. Though more often they are women, many men are presenting for the first time with rheumatoid arthritis when past fifty or sixty. Something is happening in the natural history of rheumatoid arthritis that is making it no longer a disease of young adults. What this something is I do not know.

GENERAL TREATMENT

The treatment of rheumatoid arthritis can broadly be discussed under two heads: (1) general non-specific therapy to build up the general health, increase the weight, strengthen the muscles, prevent deformity, and maintain mobility; and (2) drugs aimed specifically at the disease process. In our present state of ignorance of the exact ætiology of rheumatoid arthritis, we should regard the first type of treatment as the more important. A wide range of physiotherapy is our great stand-by in the treatment of rheumatoid arthritis. The correct prescription and management not only of movement but also of rest and relaxation come within the scope of physiotherapy.

Rest and Activity

Rest, mental as well as physical, is of paramount importance. We are all aware of the stress of modern life and of the important part played by psychogenic factors in rheumatoid arthritis. If by skilled medical and nursing attention worry can be at least shelved for the time being, the benefit to the patient is remarkable. It is surprising how a week or two of rest in hospital can alter the outlook of a woman who has been bearing the double burden of managing and catering for a household and trying to disregard the pain and stiffness of affected joints.

Local rest for the affected joints must also be prescribed. There is always the bogy of contracture, deformity, and crippling looming up in the vision of the rheumatoid arthritic. Deformity and crippling are the results of muscle spasm, and these spastic muscles must be relaxed and rested. In plaster technique we have a most successful weapon which takes over the task of maintaining immobility from the muscles. If a group of muscles goes into spasm to rest a joint, the strongest muscles exert more pull and cause joint deformity. Well-applied plaster-of-paris splints have no such disadvantage in resting joints, and the value of such splints in relieving muscle spasm and maintaining immobility is well established.

Immobility must be only a temporary measure, for immobile joints automatically become stiff. One therefore has to choose the critical point at which mobilisation can start. Our guide here is the passing-off of muscle spasm and the relief of pain. When assisted and active movements are initiated, care must be taken to avoid fatigue or pain, for either may undo the good done by rest and lead once more to muscle spasm.

It is not easy to prescribe rest and activity in correct proportion, and I recently saw a puzzling case in which the patient was progressing very unsatisfactorily with an undue amount of pain and spasm, and this was found to be because, while physical therapy was being judiciously prescribed, an enthusiastic occupational therapist was filling in the patient's spare time with very energetic remedial exercise.

There are other measures which help the condition. The joint structures can be relaxed and softened by local heat; and the contraction of wasted muscles can be re-educated by guiding faradic contractions. I also find general ultraviolet rays helpful, though I can claim no specific action for it.

Body Mechanics

We are apt to disregard the lessons on body mechanics taught us by Goldthwait et al. (1941), who drew attention

* Abridged from a presidential address delivered to the section of physical medicine of the Royal Society of Medicine on Oct. 8, 1947.

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to the correct position in which we should nurse our patients in bed, and the importance of permitting and encouraging adequate chest expansion.

The knee-joint in the rheumatoid arthritic so often becomes affected and fixed in poor position that I now warn all arthritics of the dangers in store if these joints are neglected. We have all seen patients whose general condition is fair, and who have useful function in their other joints but are crippled because of flexed knees. For this the sitting position is largely responsible. Helpful relations will arrange the patient in a sitting position and leave her in that position all day. The relations (or even the nurse) will put two or three pillows under the knees at night to perpetuate this flexion. I recently saw a young married woman with rheumatoid arthritis who had spent three years in a sitting position; her other joints were not severely affected, and her general condition was surprisingly good; but, because she was one of a large family of sisters who had looked after her to the best of their limited knowledge without seeking competent medical advice, she was a hopeless cripple presenting a serious orthopædic problem.

The sitting position is dangerous in rheumatoid arthritis, and patients must be taught to keep their knee-joints extended rather than flexed.

Telling the Patient

How much should we tell our patients about their own condition and the régime they must follow? Hench (1947), at the Mayo Clinic, gives his arthritics a set series of three lectures before they leave hospital. The dissemination of medical knowledge among patients is carried out far more in America than in this country. It has its advantages as well as its disadvantages, but I feel that the patient's own personality and psychological condition should be the guide to how much to tell her, for what might encourage one patient would frighten another.

Conclusion

Our most potent weapons against rheumatoid arthritis, then, are rest and non-specific physiotherapy. Some say that this is not treatment at all but merely palliation, and they would probably advocate specific treatment claimed to be directed against the cause of the disease. A large body of opinion supports the effectiveness of chrysotherapy in rheumatoid arthritis, yet no-one seems satisfied with this, and year by year, as regularly as clockwork, new treatments are devised and advocated. There is as yet no treatment for rheumatoid arthritis that can compare with the specific action of vitamin D in rickets or of sulphonamides and penicillin in acute bacterial infections.

ASSESSMENT OF PROGRESS

The American Rheumatism Association (1942), in its *Primer on Arthritis*, says:

> "Few accurate statistics on the natural course of the disease are available, but in general it may be said that fewer than one-fourth of the patients 'recover,' one-half 'improve' or the disease becomes 'quiescent,' and the remaining one-fourth become progressively worse. Prognosis in an individual must be guarded. It is particularly important that these facts should be borne in mind when one is assessing the value of any therapeutic regimen."

The last sentence is of particular importance. At the Copenhagen conference Steinbrocker (1947) drew attention to the lack of objectivity with which the results of treatment are often assessed, and he appealed strongly for accurate diagnosis and a long follow-up. We all know how difficult it is to devise and conform to objective assessments of improvement in chronic arthritis; the case-sheets devised for objective recording are so complicated and detailed that they commonly defeat their own object. If we stick merely to the terms "cured or quiescent," "improved," and "no better," the middle category can readily include those patients who report on their more comfortable days and wish to please and encourage the doctor who is doing so much for them. I therefore decided to classify all my rheumatoid arthritics who had attended me for at least a year (this I agree is not really sufficient), and whose rheumatic history I had been able to follow, according to the categories described in the American primer. Thus category I embraces those patients who recover, category II those whose arthritis becomes quiescent, and category III those who steadily go downhill and become crippled. I examined 119 patients and obtained the following classification:

	Cases
Category I	6 (5%)
Category II	67 (56%)
Category III	46 (39%)
Total ..	119

Category I is proportionately smaller than that given in the primer because some patients with transient and mild attacks might not attend a clinic and might readily default before a year was up. The middle category fits in well with the American figures. But a point which struck me most forcibly when going over the history of their rheumatoid experiences with these patients was that they were a shifting population. Because a patient was in category II she would not necessarily stay there; she might move up to category I but was more likely to gravitate down to category III during her rheumatoid lifetime. These changes may occur very quickly and unexpectedly. An advantage of grouping rheumatoid arthritics in this way is that one can easily illustrate their histories graphically. Here are two examples, one in a woman who has only recently developed rheumatoid arthritis, and the other in a man with a long history.

Case 1.—A married woman, aged 34, developed rheumatoid arthritis in the spring of 1946. She was treated with vaccines without improvement and, after spending her savings on this form of treatment, came to my hospital. I took her in when she was well in the middle of category II (fig. 1). I treated her with rest in bed and general physiotherapy. She has done well and is putting on weight and has no difficulty in doing her housework; but she is sufficiently affected to remain in category II.

Case 2.—A man, aged 60, with a long history of rheumatoid arthritis. After two courses of gold he was very well (fig. 2). He could have been called a "cure." He then stayed away from hospital, in spite of appeals from us, until he had a relapse in 1940. We got him over that, and again he went to work and defaulted. His next relapse in 1945 was severe and crippling.

"SPECIFIC" TREATMENT

Many who treat rheumatoid arthritis speak of a certain treatment as the one which must be adopted if

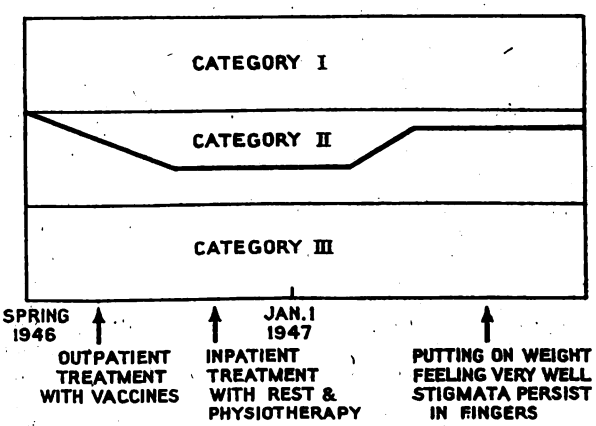

Fig. 1—Progress and assessment of case 1.

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the doctor has the interest of the patient at heart. Yet these same workers are always seeking and sometimes devising something new, which shows that they are not really satisfied. The substitution of bismuth and of copper for gold are examples of this.

Chrysotherapy

Gold is probably the most widely used and most supported of the specific drugs for rheumatoid arthritis. It was first used because of two false premises: (1) that the tubercle bacillus could be attacked successfully with gold in vivo; and (2) that rheumatoid arthritis was connected with tuberculosis. Its use in the early days was received with enthusiasm by some workers, especially on the Continent, and with scorn by others, especially in America. It has had a long innings in which its critics have become guarded advocates; enthusiasts have tempered their enthusiasm with criticism; the optimal dosage has been modified; and many adjustments have been made. Hench (1947) carefully balances its undoubted value in some resistant cases against its occasional complete failure and undoubted toxicity and possible lethality. Dividing my 119 patients into those

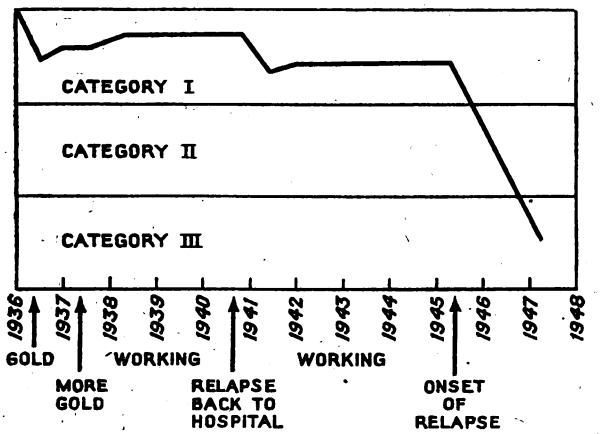

Fig. 2—Progress and assessment of case 2.

who had never had gold and those who had been treated with it, I obtained the following result:

	No gold	*Gold*
Category I	5 (7%) ..	1 (*2·0%*)
Category II	45 (*64%*) ..	22 (*45·5%*)
Category III	20 (*29%*) ..	26 (*52·5%*)
Totals ..	70	49

The groups are, however, not comparable. The first group probably contains the less severely afflicted, since severe cases would probably be more likely to receive gold. One patient in each group died—in the "no gold" group from intercurrent infection on top of nephritis; in the "gold" group from thrombocytopenia due to the gold. There were 7 (14%) severe gold reactions. These figures bear out Hench's judgment on the dangers of gold. Nevertheless one occasionally meets the resistant case of rheumatoid arthritis which is going downhill, heading for category III in spite of all treatment, and if one sees permanent crippling ahead one probably weighs the risks and decides in favour of gold. The odds are that the gold will enable the patient to turn the corner, but there is a definite risk. My present policy is not to use gold until every general measure has failed and the condition continues to deteriorate.

Other Methods

It is because gold sometimes fails and is often toxic and occasionally lethal that we continue our search for something else which will be more effective, less toxic, and not lethal. There is no end to the treatments advocated—bismuth, copper, protein shock, jaundice, splenectomy, erepsin, 'Ertron,' spinal pumping, and the blood of pregnant women.

The results claimed for various treatments, if closely examined, all seem to be roughly the same: about 75% of cases improve or are cured, and about 25% are no better. No wonder the Americans speak of "the inevitable 70%." My "no gold" group of patients who had general treatment only would fit well into this, with 7% cured, 64% improved, and 29% worse.

Let us take another case from my series.

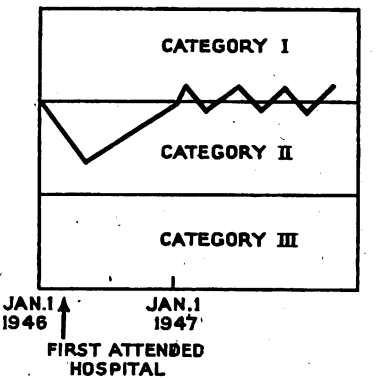

Fig. 3—Progress and assessment of case 3.

Case 3.—A foreman ganger, aged 58, came to hospital with three months' history of malaise, weakness, and swelling of the fingers and wrists. He had rheumatoid arthritis with typical changes in the hands, wrists, and elbows, and an erythrocyte-sedimentation rate (E.S.R.) of 17 mm. in the first hour. I thought him a sufficiently acute case to put his name down to come into hospital. While he was waiting for a bed he was treated with irradiation by the carbon arc and wax baths for his hands and wrists. Six weeks later he asked that his name should be taken off the admission list, since he felt very much better. His E.S.R. was then 5 mm. in the first hour. He has never looked back. He still works as a ganger, and I see him once every three months. I cannot put him entirely into category I, since he has residual signs in his elbows and wrists. I will not discharge him, because I never discharge a rheumatoid arthritic.

Whatever treatment I had given that man in his acute phase—splenectomy, vaccines, copper, or sodium bismuth tartrate—could have been held responsible for his "cure." This bears out the repeated pleas one hears for adequate follow-up and assessment of improvement. I cannot consider him "cured," I have seen too many relapses.

How then can we compare the other specific treatments with gold? We have now reached a stage when there is a very extensive world-wide literature on gold. We know much more about it than we do about the various other treatments continually being devised; we know that in resistant cases it sometimes but not always causes remarkable improvement. We know that many other rather violent and potentially dangerous treatments may do the same—splenectomy, spinal pumping, and so on. Most patients and most physicians would prefer to try gold in a difficult case before splenectomy or spinal pumping. But gold does not cure rheumatoid arthritis; however effective it is initially, it does not preclude the possibility of relapse (see case 2, once a gold "cure"), nor does it do away with the need for lifelong supervision.

Conclusion

Until we gain a more exact knowledge of the ætiology of rheumatoid arthritis, general methods are our first line of attack, while gold gives us a risky second line of defence.

SUMMARY

The cause of rheumatoid arthritis is unknown; it may be either infective or allergic.

Since the cause cannot be attacked with certainty, treatment must be directed to the effects.

The most important treatment is physiotherapy, which includes general and local rest, followed by mobilisation of the joints.

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Chrysotherapy is risky but is worth trying after all other methods have failed.

Whatever the treatment, about 75% of cases improve.

REFERENCES

American Rheumatism Association (1942) Primer on Arthritis. Chicago.
Coburn, A. F. (1945) *Amer. J. Dis. Child.* 70, 339, 348.
Gibson, H. J., Kersley, G. D., Desmarais, M. H. L. (1946) *Ann. rheumat. Dis.* 5, 141.
Goldthwait, J. E., Brown, L. T., Swaim, L. T., Kuhns, J. G. (1941) Body Mechanics in Health and Disease. Philadelphia.
Hench, P. S. (1947) *Ann. intern. Med.* 26, 618.
Kersley, G. D. (1947) *Proc. R. Soc. Med.* 40, 343.
Sequeira, J. H., Ingam, J. T., Brain, R. T. (1947) Diseases of the Skin. London.
Steinbrocker, O. (1947) Proceedings of the European Congress on Rheumatology. Copenhagen.

VESICOCAPSULAR PROSTATECTOMY

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THOUGH it is a commonplace that the treatment of prostatic obstruction carries many risks, this fact is sometimes overlooked in an enthusiasm for a particular procedure. The surgeon, forgetting how much patients differ in bodily design and function and in temperament, vainly hopes to obtain the best results from one standard operation which he uses for all cases. Urologists will not make this mistake, for they are well acquainted with alternative methods—e.g., perurethral prostatic resection—but in adding another variety to the operations for benign enlargement of the prostate I should explain that I do not regard it as suited to the needs of every patient, but as an operation which, when the removal of the prostate in one stage is judged expedient, gives a good exposure of the bladder as well as the prostatic region; it also provides good hæmostasis and so allows of closure of the bladder with only catheter drainage, but can be concluded if desired by the addition of a suprapubic tube in the bladder.

Patients with prostatic obstruction are not young men; yet advanced years are often less important than the state of the tissues, particularly of the heart and blood-vessels. Degenerative processes affecting the cardiovascular system greatly increase the hazards of any major operation, especially one involving blood-loss. As regards the state of the upper urinary tract, the history and a general examination of the patient, combined with estimations of blood-urea and with intravenous urography, will give definite information, and the surgeon is nowadays well warned of any defects in that system. Factors which have helped to increase the safety of prostatic operations at present are particularly the modern methods of anæsthesia and the use of sulphonamides and penicillin; these have greatly lessened the risks of postoperative thrombosis and pulmonary complications and diminished sepsis. Yet the fact remains that, though many patients are in good condition, strong, and confident, others are feeble and have to be supported both before and after the operation by all possible means; and there is one thing which is always in doubt in prostatic surgery—i.e., how much bleeding will be produced by the operation and how the patient will react to the loss of blood—though there is no doubt that if uræmia exists or threatens, the effect of heavy loss may be expected to be bad.

HÆMORRHAGE

Of all the possible dangers inherent in prostatectomy it has always seemed to me that blood-loss is the most serious; and I still hold this view, even in these days when it is so easily replaced by transfusion. Indeed, I attach more importance to it than I did previously, now that such great advances have been made in the preventives and in remedies already mentioned; for, unlike other operations, prostatectomy can never be performed without hæmorrhage. The amount of blood lost varies enormously; it may be quite unimportant, or it may be severe enough to cause some anxiety during the operation and before measures to control it can be carried out. To minimise the loss, from the moment at which the enucleation is begun speed is important, and the operation should be completed in the shortest possible time consistent with accurate work. Continued loss after the operation depends chiefly, but not entirely, on the operative technique.

The total loss during these two phases may or may not have an immediate serious effect on the patient, but it is certain that in the long run it may seriously retard his recovery. Some of the older patients have but poor powers of regenerating this tissue. It is largely because of their hæmostatic virtues that the operations of Harris, Millin, and Wilson Hey have produced such good results, though Wilson Hey attaches still greater importance to measures which he believes eliminate sepsis.

ADVANTAGES OF VESICOCAPSULAR PROSTATECTOMY

The operation described below, which I call vesicocapsular prostatectomy, gives a better exposure of the prostatic bed than do those of Harris or of Wilson Hey and admits of a general inspection of the bladder, which is not included in the retropubic operation. Millin always cystoscopes the patient before beginning his operation; yet, if the intravesical projection of the prostate is large, it is impossible to see into the recess behind it (this area can and should be examined during the operation), and hæmorrhage produced by the cystoscope, however carefully it is passed, may sometimes make accurate inspection difficult even when a modern flushing instrument is used.

In vesicocapsular prostatectomy the hæmostasis obtained is commonly good enough to admit of complete closure of the bladder and reliance on drainage by a tied-in catheter, a conclusion to the operation which should always be aimed at. If, however, there is doubt about this, additional drainage with a cystotomy tube can readily be added.

SELECTION OF PATIENTS

Like other urologists, I do not advise an operation for prostatic enlargement merely because of the enlargement, except sometimes when hæmorrhage is troublesome. For an operation to be necessary there must be clear evidence of obstruction as shown by interference with normal micturition. This is indicated by the symptoms, by trabeculation and sacculation, or by an increasing volume of residual urine, particularly when this amounts to a serious degree of retention and back pressure on the kidneys is present or threatened. Persistent bladder sepsis, calculus formation, and the development of vesical diverticula are other conditions which necessitate operations on the prostate.

Perurethral operations are in my view the best treatment when the prostate, though obstructing, is but slightly enlarged, and in considerable degrees of enlargement when the patient's general condition is bad, even though in such cases it may be necessary to do the resection in two stages, and even sometimes despite the fact that preliminary cystotomy has already been done. It follows therefore that, generally speaking, I reserve prostatectomy for moderate or gross enlargement in relatively fit men, and the form of prostatectomy which I now commonly adopt is the vesicocapsular operation, except in those cases in which protracted suprapubic drainage is necessary, when I use Freyer's operation in two stages.

Patients are routinely treated with penicillin and sulphadiazine immediately before operation, and afterwards this treatment as a general rule is continued until the catheter is removed.

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OPERATIVE TECHNIQUE

The abdomen, penis, scrotum, and perineum are cleansed and prepared with spirit. The urethra is irrigated with a syringe containing oxycyanide of mercury solution 1–6000, or with a solution of 'Milton' 1 drachm to 1 pint. If the bladder in spite of preliminary treatment is septic, a catheter is passed and it is washed out, about 6 oz. of lotion being left in it.

A vertical incision is made in the midline of the abdomen, beginning immediately above the symphysis and extending upwards for 3 in., the recti and pyramidalis muscles are separated in the usual manner, and the anterior surface of the bladder is exposed. Alternatively a transverse skin incision can be used.

The vesical neck is identified by inspection and by palpation of the upper limits of the prostate; tissue forceps lift up the bladder wall, and this is opened for about 1 in. immediately above the venous plexus which surrounds the vesicoprostatic junction. If no preliminary cystoscopy has been done, it is now necessary to extend the incision in the bladder upwards for another 2 in. to admit of full examination after a bladder-retractor is in position; a small mobile electric lamp is sometimes useful for this purpose.

If it is not desired to examine the main bladder cavity, or in any case after this has been done, the next step is to prolong the incision downwards to the vesical neck and through the anterior commissure of the prostate. This is effected without cutting through the preprostatic venous plexus, for this can easily be displaced forwards towards the symphysis pubis. For this purpose the plane of dissection lies between the layer of pelvic fascia containing the veins and the true anatomical capsule of the gland, and this plane is defined and opened with the points of curved Mayo scissors, which are passed down deep to the fascia and close to the prostate in the midline, the blades being then opened. In this manner as much as is desired of the central part of the anterior prostatic surface can be cleared, usually without the need to cut any vessels.

A self-retaining bladder-retractor is now introduced and opened, and the middle blade is placed in position. If the clearance of the front face of the prostate is not adequate, the process can be continued. No attempt is made to detach extensively the fascial envelope and the contained venous plexus in the direction of the lateral margins of the gland; only a clearance close to the midline is necessary, and this should extend for about half the distance from the upper border of the gland down towards its apex, thus keeping well clear of the region of the compressor urethræ.

When the plane of dissection has been partly opened up, its further clearance is facilitated if the assistant inserts a stiff copper retractor $^3/_4$ in. wide between the prostate and the fascial layer, the retractor being bent into a form which enables his hand to rest without effort upon the region of the symphysis pubis.

The midline having been adequately cleared, one blade of a pair of blunt-pointed straight scissors is passed down the urethra, and the other blade is placed immediately in front of the bared anterior commissure, and thus this is divided for about 1 in., or more if the gland is large. The adenomata are now to be enucleated.

Before this is done I usually incise the mucosa overlying the vesical surface of the prostate in a circular manner close round the internal urinary meatus, using a diathermy needle and a weak coagulating current. The object of this is to ensure that as much as possible of the mucosa is preserved, and to minimise hæmorrhage from its cut edge. Special care is taken in using the diathermy that no current shall pass into the pubic bones by accidental contact, since some cases of periostitis which have been described may possibly have resulted from such injury.

The retractor having been removed, and if necessary with the aid of two fingers in the rectum, the enucleation is begun at the lowest part of the left adenomatous mass, this and then the opposite side being freed from below upwards. The final detachment of the upper margin of the enucleated mass is often completed with scissors or by diathermy after the bladder-retractor is once again in position. The assistant now inserts the copper retractor into the prostatic bed and lifts the front of this towards the pubis. A good view is thus obtained, and this can, if necessary, be improved by a clamp on the trigonal margin by which it is pulled upwards and backwards. Vessels at the upper limit of the cavity can be secured by suture, a method which I prefer, or by diathermy coagulation. Any arteries spurting in the depth of the cavity are also well seen and can be dealt with. At this stage partly detached pieces of false capsule and any small separate adenomata which remain are also cleared away.

A Harris catheter, usually of no. 24 Charrière gauge, on an introducer, is passed through the penis; or, better, this is combined with a perineal incision in the urethral bulb, as recommended by Sandrey, and its position is adjusted so that one eye is in the bladder and the other in the prostatic cavity. When perineal drainage is adopted, the catheter is much more likely to remain accurately in position than if it lies wholly in the penile urethra. Should an overhanging shelf be found at the bladder outlet this is cut away from beneath the trigone, none of which is removed. I rarely use a Harris retrigonisation stitch.

The long blades of the bladder retractor are now replaced by shorter ones which hold aside only the abdominal wall; the middle blade, which must be narrow, is for the moment left in position within the bladder, a procedure which causes the margins of the incision in the bladder and in the prostatic capsule to be stretched together in a manner easy for suture. With a large boomerang needle two or three, or sometimes four, sutures are placed across the prostatic cavity. They are passed from outside it, traverse the coverings of the capsule and the capsule itself, then cross the cavity, and emerge on the opposite side in the same manner. The first is placed across the lowest part of the cavity: the last and uppermost is at the vesical neck. They are passed widely and deeply, their object being to obliterate in large measure the prostatic bed. A finger is passed into the bed after each is tied, to see that this has been effected, and to determine that there remains room for the finger as well as the catheter, and thus guard against excessive compression. These sutures are of great importance in effecting hæmostasis.

Any clots in the bladder are now cleared out, the middle blade is removed, and, with a small boomerang needle or a Mayo needle in a holder, the closure of the bladder is completed by a continuous suture passing through all the coats. If desired this suture need not include the mucosa. It is usually supplemented by a second continuous suture beginning on the anterior surface of the prostate and extended upwards.

Penicillin-sulphonamide powder is insufflated over the whole area, a small tube is placed immediately above the symphysis to drain the prevesical space, and the wound is closed in the usual manner; the bladder is then syringed and sucked out to remove any clots. Vasotomies are always performed.

POSTOPERATIVE TREATMENT

For the first few hours after operation and until diuresis is established I prefer the catheter to drain directly into a sterile glass urinal. Later it can be connected to a light piece of tube draining into a sterile receptacle beside the bed. Skilled nursing is required, for the drainage must be watched attentively until it is clear that hæmorrhage is unimportant. To maintain drainage for the first few hours syringing and suction may be necessary, but the less syringing done the better. As already stated, if necessary the bladder is not closed completely; in addition to the catheter a tube of the de Pezzer type is used to provide suprapubic drainage. Such extra drainage is not often required; but, when it is, the tube is commonly removed after forty-eight hours, and the fistula then closes promptly. If the bladder has been closed at operation, the catheter is normally removed on the sixth day; sometimes it is removed earlier but little seems to be gained by this, even when the bladder is already soundly healed.

COMPARISON WITH HENRIKSSON'S OPERATION

I began to use this vesicocapsular operation in November, 1946. In March, 1947, Prof. Karel Nenwirt, of Czechoslovakia, who was visiting London, drew my attention to a paper[1] by Dr. S. Hybbinette, of Stockholm, published in 1935, in which a similar operation is described as having been devised by Dr. Henriksson, of Flen, Sweden. The prostate and its capsule in this operation were incised in the midline over a catheter in the urethra, and this incision was enlarged to expose the plane between the adenoma and the capsule, and the glandular hypertrophy was then enucleated. Drainage was provided by a de Pezzer tube passed along the

1. *Arch. klin. Chir.* 1935, **183**, 145.

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urethra in a retrograde manner, the funnel end being adjusted to lie at the bladder neck. The bladder was then closed. After ten days a catheter was substituted for the de Pezzer tube. In Hybbinette's paper 15 operation cases are mentioned. The chief difference between Henriksson's operation and mine is that in mine the incision into the prostate capsule is minimal in easy cases with little bleeding, but can be extended according to the type of case, as when a large prostate has been enucleated, or to see bleeding points which are not otherwise visible.

REVIEW OF CASES

I have used this operation in 50 cases; in one it was combined with the excision of a vesical diverticulum of moderate size, and in another I had removed a ureteric calculus a month previously. In 2 cases the patients died; one was a man, aged 68, who had prostatic carcinoma, not recognised as such until much difficulty in enucleation made the diagnosis probable, and ultimately confirmed by microscopy. It was known that he had a left hydronephrosis of moderate size. He died of pyelonephritis and should not have been submitted to any form of prostatic enucleation. The other was a man, aged 62, who died suddenly twenty-four hours after an operation which had been easily carried out except for certain difficulties in anæsthesia and had apparently been entirely successful. The cause of death was not determined. In the remaining 48 cases the average age was 68, the oldest patient being 80 and the youngest 50.

In 6 cases the patients were admitted with acute retention of urine. In 4 there was chronic retention, the bladder being distended above the umbilicus. All were treated by catheterisation. The remainder were a typical group of patients with obstruction due to benign enlargement of the prostate, some with clear and others with infected urines. None of them showed severe uræmia. In a few instances the patients were judged for general reasons to be decidedly poor risks; 1 had severe pernicious anæmia and 1 had auricular fibrillation. The prostates were classified for size as follows: small 5, medium 21, large 21, very large 2.

In 32 cases the bladder was closed at operation; in 16 cases a suprapubic tube was added, but probably in most of these complete closure and reliance on catheter drainage would have proved satisfactory.

Hæmorrhage following operation and making troublesome the maintenance of catheter drainage has sometimes occurred, but chiefly in the earlier cases, and more recently this appears to have been overcome; but, as already stated, careful nursing is important, and in the first few hours a little judicious syringing and suction must be available if required. If such skilled attention cannot be provided, it is clearly unwise to rely only on the catheter. In 2 cases special measures to evacuate the clots of reactionary hæmorrhage were necessary; in 1 of these, where the bladder had been closed, a cystotomy was judged necessary.

Secondary hæmorrhage occurred in 3 cases. Of these patients 1, whose hæmorrhage was severe, was in very poor general condition before admission, and for some time the urine had been extremely septic and accompanied by a profuse urethral discharge. A Freyer prostatectomy in two stages would have been better for this man. Of the 2 other cases, infection was present before operation in 1 and absent in 1.

The end-result on discharge from hospital was satisfactory in all cases except 1, in which the suprapubic wound had leaked for thirty days after operation; the patient had then left hospital with a catheter in position but the wound had leaked no more, and was reported permanently healed a week later.

Except for the patient just mentioned, who, after a period of apparently good health, died of a mediastinal tumour eight months after discharge, the late results have all been good. Symptoms have been relieved, the patients are pleased with the outcome, and there have been no late complications. The urine is quite clear in many cases; in some there is still turbidity, but it is not grossly infected in any.

Though the series is small it seems to show that vesicocapsular prostatectomy is based on sound principles.

ANTI-HISTAMINE DRUGS IN ASTHMA

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THE fundamental studies which support the belief that histamine plays a part in anaphylaxis and allergy have been reviewed by Dragstedt (1941), Feldberg (1941), and Rocha e Silva (1942, 1944). Our knowledge of the effect of histamine administration is more complete in animals than in man. It is well known that its experimental administration produces severe bronchospasm in guineapigs. In man the effects of histamine have been studied by Weiss et al. (1932) and Curry (1946a). In striking contrast to the ease with which bronchospasm can be produced in guineapigs these workers failed to produce it in healthy people by the subcutaneous or intravenous administration of histamine. In recent clinical studies our experience has been similar. On the other hand, the administration of histamine subcutaneously, intravenously, or by inhalation produced bronchospasm in asthmatic people, the degree of spasm being proportional to the clinical severity of the asthma. Weiss et al. (1932) summarise their findings as follows: "These observations establish the fact that the asthmatic patient reacts not with increased sensitivity but with an altered response, that is idiosyncrasy, to histamine." The other effects produced by the administration of histamine to asthmatics differ little if at all from those produced in healthy people.

Curry (1946b) found that 'Benadryl' administered intravenously produced a rapid protection against both the systemic and bronchoconstrictor effects of parenterally administered histamine in asthmatics. Though this evidence did not prove that histamine was an ætiological factor in clinical asthma it encouraged the hope that anti-histamine drugs might be of value in the prevention and treatment of the disorder. The reports of their use in asthma are, however, extremely confusing and contradictory.

The first anti-histamine drug found suitable for clinical use was the French preparation 'Antergan,' introduced by Halpern (1942). Gaté et al. (1942), Celice et al. (1942), and Decourt (1942) found it effective in preventing asthma but not in controlling the acute attack. After the introduction by Bovet et al. (1944) of 'Neoantergan,' Pellerat (1946) claimed that it improved 45% of asthmatics, but Feinberg (1946) reported that no more than 1 patient in 5 derived any benefit from it.

Benadryl (Loew et al. 1945) and 'Pyribenzamine' (Mayer et al. 1945) have now been used extensively in asthma, but the reports on their usefulness in this condition are also conflicting.

Using benadryl, Koelsche et al. (1946), Levin (1946), and Waldbott (1946) claimed benefit in 74%, 65%, and 30% of cases respectively. Koelsche observed that there was a greater relief in seasonal than in perennial cases. On the other hand, Feinberg (1946) reported improvement in only

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12% of cases, and Blumenthal and Rosenberg (1947) had disappointing results.

Using pyribenzamine, Arbesman et al. (1946) and Feinberg (1946) reported benefit respectively in 50% and 28% of the cases treated.

Waldbott (1947), in a review of the clinical use of all anti-histamine drugs, claims that in 40–50% of cases of asthma the number of attacks is reduced by their oral administration, and that the attack itself is relieved in 65–75% of cases by their intravenous administration—the improvement occurring in some cases which had proved resistant to adrenaline and aminophylline.

When we began our studies on the use of anti-histamine drugs in asthma, only benadryl and neoantergan ('Anthisan,' May and Baker) were available. The preliminary work by French and American investigators and by Schild (1946) in this country suggested that neoantergan was the drug of choice as it seemed to be the more potent and less toxic of the two. Our early preference for neoantergan over benadryl for use in this study has been amply justified by the more recent work on the subject. Winter (1947), in a comparison of the potency of six anti-histamine drugs against histamine in animal studies, showed that neoantergan was not only the most potent anti-histamine but also had the highest toxic: effective dose ratio. Dews and Graham (1946), Friedlaender et al. (1947), Reuse (1948), and Schild (1947) also found that neoantergan had a more specific and powerful anti-histamine action than benadryl, though benadryl was 60–70 times more powerful than neoantergan as an antagonist to acetylcholine. This is shown clinically by the dry mouth which its administration often produces. It seemed to us unlikely that the anti-acetylcholine action of benadryl would be particularly valuable in the treatment of asthma, since atropine—much more potent than benadryl as an antagonist to acetylcholine—has proved consistently disappointing in asthma. Further, since benadryl has a protective effect against the bronchospasm produced by the experimental administration of histamine to asthmatics, whereas atropine has no such effect, it is plain that the beneficial action of benadryl in this respect is due to its anti-histamine, rather than its anti-acetylcholine, action. It therefore seemed wise to use the most potent anti-histamine, neoantergan, rather than the weaker anti-histamine and more potent anti-acetylcholine, benadryl. Neoantergan has also been shown by Code (1947) to have a greater anti-histamine effect than benadryl in its capacity to reduce the histamine weal-and-flare reaction in human skin.

The difficulties in the therapeutic assessment of any drug or form of treatment in asthma are notorious. The spontaneous fluctuations in severity and frequency of the attacks and the suggestibility of its sufferers to any form of treatment—especially if it is new and administered with impressive gravity—has made asthma the happy hunting-ground for the uncritical therapeutic enthusiast. In this study, therefore, every effort was made to select suitable patients and to eliminate as far as possible the psychological factor in response to treatment.

EXPERIMENT

A selection was made of 35 patients who had all had frequent attacks of what might be called allergic asthma—i.e., they were not elderly people with emphysema or bronchitis but children or young adults most of whom had clear-cut attacks not apparently conditioned by previous respiratory infections. All had an allergic family history and allergic nasal mucosæ uncomplicated by nasal sepsis. All of them gave a history of associated allergic phenomena, such as infantile eczema, urticaria, angio-neurotic œdema, hay-fever, and paroxysmal rhinorrhœa.

A record was kept of the number of attacks of asthma experienced by each patient in the three months before treatment. No treatment was given during this control period apart from the treatment of the attack itself with adrenaline or with ephedrine. During the next three months neoantergan was administered to alternate cases, and dummy tablets of identical appearance containing starch and lactose to the others. During the last three months those patients who had had neoantergan were given dummy tablets, and those who had had dummies were given neoantergan, the patients being kept in ignorance of the change of treatment. The number of attacks of asthma experienced by each patient in the control period and in the two subsequent periods of treatment were carefully noted and are recorded in the accompanying table.

Dosage.—The quantity of the drug given daily varied with the age of the patient, children under the age of 5 years being given 0·1–0·2 g., whereas those aged 5–12 years were given up to 0·3 g. Children over 12 years

NUMBER OF ATTACKS OF ASTHMA IN THREE MONTHS, BEFORE TREATMENT AND DURING TREATMENT WITH ANTHISAN OR WITH INACTIVE TABLETS

Case no.	Age (years)	Before treatment	Daily dose (g.)	With anthisan	With inactive tablets
1	33	10	0·6	3	2
2	5	24	0·15	9	10
3	6	12	0·3	5	2
4	11	6	0·6	4	4
5	8	4	0·3	0	0
6	16	5	0·6	2	1
†7	25	9	0·6	1	3
†8	10	12	0·2	3	6
9	12	6	0·3	0	0
†10	11	10	0·3	0	4
11	9	1	0·3	0	0
*12	22	3	0·6	Status asthmaticus	2
13	8	3	0·3	4	3
14	15	2	0·3	3	4
15	16	10	0·3	Frequent mild bronchospasm	0
*16	19	1	0·3	Status asthmaticus	1
17	12	Per. bron.	0·4	Per. bron.	Per. bron.
18	17	3	0·6	6 in 1 month	Status asthmaticus
19	15	5	0·3	5	6
20	13	6	0·6	6	5
21	4	6	0·2	6	Did not receive dummy tablets
22	10	Nightly	0·3	Nightly	
23	4	Nightly	0·1	Nightly	
24	16	12	0·3	10 in 6 weeks	
25	15	25	0·3	Status asthmaticus	
‡26	19	15	0·8	More frequent and severe	
27	42	Nightly	0·6	Nightly	
28	29	Nightly	0·6	Nightly	
29	11	8 (1 month)	0·2	Per. bron.	
30	9	Frequent	0·2	Per. bron.	
31	6	Per. bron.	0·2	Per. bron.	
*32	21	Nightly	0·8	Nightly	

Per. bron. = persistent bronchospasm.
* Required admission to hospital.
† Improvement not maintained during further period on active tablets.
‡ Treatment abandoned by patient (dental student) after a month.

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were given the adult daily dose of 0·3–0·6 g. Two of the adults received 0·8 g. daily. The drug was given three times a day, the last dose being given as late as possible at night to "cover" the hours of sleep. In each case the number of dummy tablets given daily corresponded to the number of active tablets.

RESULTS

Of the patients originally selected 3 defaulted and are not included in the table. It was possible to interview 2 of them later, who said that they had not found the treatment of any value and therefore had not returned to the clinic. In 12 cases (cases 21–32) there was so obviously no improvement with neoantergan that it was considered unnecessary to give dummy tablets.

The table shows that in 11 cases (cases 1–11) treatment of some sort, whether active or inactive, led to a diminution in the number of attacks. When the emotional factor in asthma is taken into account this is not a surprising result. Without careful control this improvement might have been attributed to the beneficial effect of neoantergan in 11 out of 32 cases (34·3%). It is plain, however, that with the possible exception of 3 cases the results with dummy tablets were as good as with neoantergan. The 3 patients (cases 7, 8, and 10) who appeared to benefit by neoantergan were given a further trial with active tablets. In none of them was the improvement maintained.

The asthmatic state in 4 patients (cases 12, 16, 25, and 32) appeared to be definitely worse during the administration of neoantergan; 3 of them became sufficiently ill to necessitate their admission to hospital. In case 25 the administration of neoantergan was followed by a severe asthmatic attack on three separate occasions. Levin (1946) reported this finding in 4 out of 87 cases of asthma. Decour (1945) remarks that asthma is an occasional side-effect of anti-histamine therapy, and Hunter (1947) has reported the occasional occurrence of true spasmodic asthma in cases receiving anti-histamine drugs for urticaria.

Side-effects were of the same nature and occurred with similar frequency as in other studies with anti-histamine drugs. They included sleepiness, nausea, and dizziness in that order of frequency. In no case were these side-effects sufficiently severe to interfere with treatment. It was noted that children tolerate neoantergan very well.

SUMMARY

This study suggests that neoantergan, the most potent anti-histamine drug at present in clinical use, is of no value in the prevention of asthma.

Anti-histamine drugs with a more potent anti-acetylcholine action are unlikely to prove more beneficial.

We are indebted to Messrs. May and Baker Ltd. for the supplies of active and dummy tablets.

REFERENCES

Arbesman, C. E., Koepf, G. F., Miller, G. E. (1946) *J. Allergy*, **17**, 203.
Blumenthal, L. S., Rosenberg, M. H. (1947) *J. Amer. med. Ass.* **135**, 20.
Bovet, D., Horclois, R., Walthert, F. (1944) *C.R. Soc. Biol. Paris*, **138**, 99.
Celice, J., Perrault, M., Durel, P. (1942) *Bull. Soc. méd. Hôp. Paris*, **58**, 284.
Code, C. F. (1947) Conference on anti-histamine drugs at N.Y. Academy of Sciences, biology section (to be published).
Curry, J. J. (1946a) *J. clin. Invest.* **25**, 785.
— (1946b) *Ibid.* p. 792.
Decour, J. (1945) *Sem. Hôp. Paris*, **26**, 707.
Decourt, P. (1942) *Bull. Soc. méd. Hôp. Paris*, **58**, 265.
Dews, P. B., Graham, J. D. P. (1946) *Brit. J. Pharmacol.* **1**, 278.
Dragstedt, C. A. (1941) *Physiol. Rev.* **21**, 563.
Feinberg, S. M. (1946) *J. Amer. med. Ass.* **132**, 702.
Feldberg, W. (1941) *Ann. Rev. Physiol.* **3**, 671.
Friedlaender, S., Feinberg, S. M., Feinberg, A. R. (1947) *J. Lab. clin. Med.* **32**, 47.
Gaté, J., Thiers, H., Cuilleret, P., Pellerat, J. (1942) *J. Méd. Lyon*, **23**, 401.
Halpern, B. N. (1942) *Arch. Int. Pharmacodyn.* **68**, 339.

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GONOCOCCAL MENINGITIS TREATED WITH PENICILLIN AND SULPHAMEZATHINE

REPORT OF A CASE

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WE have been unable to find any record of gonococcal meningitis treated with penicillin; so the following case may be of interest:

A girl, aged 6 years, was admitted to the families' wing of a British General Hospital in C.M.F. on Feb. 1, 1947, with acute abdominal pain. She had complained of this since she had woken up crying at 6 A.M. Her mother said that, ever since leaving South Africa a year before, the child had had a recurrent vulvitis, which had repeatedly cleared in about a week under local treatment with soft paraffin.

The child was toxic and obviously distressed; there was generalised abdominal tenderness and considerable pain, chiefly central. The abdomen moved but little, was held rigid, and relaxed poorly. Tenderness could not be localised with any certainty but was suspected of being maximal in the umbilical region. Nothing abnormal was detected on rectal examination. Temperature 104°F, pulse-rate 150, respirations 24 per min. The vulva was slightly inflamed; but, in spite of this and the history, gonorrhœa was not suspected, and peritonitis secondary to appendicitis was diagnosed. The urine contained scanty red cells and moderate numbers of pus cells.

Operation (gas-oxygen and ether; Battle incision) was performed an hour after admission—i.e., 6 hours after the onset of symptoms. Purulent free fluid was found, chiefly in the pelvis, with small flocculent masses of pus and fibrin. Both fallopian tubes looked œdematous and were greyish-pink, but no definite pus could be expressed from them. The appendix, which showed some reddening and lack of lustre of its surface, was removed. Subsequent section showed acute inflammation, with polymorph infiltration, of the peritoneal coat, but the organ was otherwise histologically normal.

Penicillin, 200,000 units, was placed in the peritoneal cavity, and the abdomen was closed in layers. The patient then began a course of intramuscular penicillin, 40,000 units three-hourly.

Two swabs taken from the peritoneum at operation and one from the vagina immediately after operation all showed abundant pus cells with very numerous intracellular and extracellular gram-negative diplococci. On culture, the vaginal swab was negative, but both peritoneal swabs grew a moderately heavy pure culture of a gram-negative diplococcus. Colonial appearance and fermentation tests identified this as *Neisseria gonorrhœæ*.

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Hunter, R. B. (1947) *Lancet*, **i**, 672.
Koelsche, G. A., Prickman, L. E., Carryer, H. M. (1946) *J. Allergy*, **17**, 151.
Levin, S. J. (1946) *Ibid*, p. 145.
Loew, E. R., Kaiser, M. E., Moore, V. (1945) *J. Pharmacol.* **83**, 120.
Mayer, R. L., Hutirer, C. P., Scholz, C. R. (1945) *Science*, **102**, 93.
Pellerat, J. (1946) *Gaz. Méd. France*, **53**, 137.
Reuse, J. J. (1948) *Brit. J. Pharmacol.* (in the press).
Rocha e Silva, M. (1942) *Arch. Path.* **33**, 387.
— (1944) *J. Allergy*, **15**, 399.
Schild, H. O. (1946) cited by Dews and Graham (1946).
— (1947) *Brit. J. Pharmacol.* **2**, 189.
Waldbott, G. L. (1946) *J. Allergy*, **17**, 142.
— (1947) *J. Amer. med. Ass.* **135**, 207.
Weiss, S., Robb, G. P., Ellis, L. B. (1932) *Arch. intern. Med.* **49**, 360.
Winter, C. A. (1947) *J. Pharmacol.* **90**, 224.

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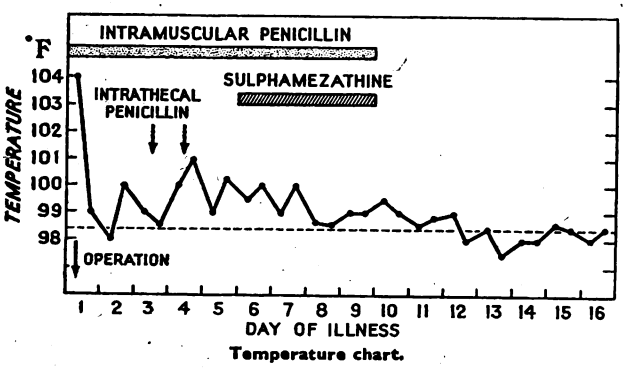
Twenty-four hours after operation the child's condition was reasonably satisfactory, and she slept peacefully under the influence of pentobarbital. Intramuscular penicillin, 40,000 units three-hourly, was continued.

On the second day after operation she complained of frontal headache. Slight neck-rigidity and a faintly positive Kernig sign were detected.

The cerebrospinal fluid (C.S.F.) withdrawn by lumbar puncture was somewhat cloudy, so penicillin, 40,000 units in 2 ml., was given intrathecally. The C.S.F. contained 1400 white cells per c.mm. (polymorphs 98%). The stained deposit showed intracellular and extracellular gram-negative diplococci. Culture of 0·75 c.mm. of C.S.F. gave a pure growth of about 200 colonies of a gram-negative diplococcus with colonial appearance and fermentation reactions of *N. gonorrhœæ*.

On Feb. 4, since the temperature was not settling, the intramuscular penicillin was increased to 50,000 units three-hourly, and lumbar puncture was again performed. Cloudy C.S.F. was withdrawn, and penicillin 50,000 units was given intrathecally. The C.S.F. contained 1000 white cells per c.mm. (pus cells 90%). The stained deposit showed scanty distorted and swollen intracellular gram-negative diplococci. Culture was sterile.



Temperature chart.

On Feb. 5 a vaginal smear contained scanty cells (pus cells 50%), and gram-negative diplococci could neither be seen nor cultured.

On Feb. 6 the temperature still showed no signs of settling, so 'Sulphamezathine' 1·5 g. was given, followed by 0·5 g. four-hourly. By Feb. 8 the child's condition was much improved, her temperature returning gradually to normal; and on the 9th both penicillin and sulphamezathine were discontinued. A total of 3,300,000 units of penicillin (Glaxo throughout) and 15 g. of sulphamezathine had been given. A blood-count on Feb. 10 showed: red cells 5,000,000 per c.mm., Hb 96% (100%≡14·5 g. per 100 ml.); white cells 11,000 per c.mm. (polymorphs 61%, lymphocytes 33%, monocytes 6%).

The patient made a good recovery and, when discharged on Feb. 19, appeared to be physically and mentally normal. Both parents were thoroughly questioned and examined, but there was no evidence of gonorrhœa. They were instructed to bring their child for vaginal swabbing every week for the next 3 weeks and thereafter every month for 5 months.

DISCUSSION

Henderson and Ritchie (1909) reviewed 27 cases of gonococcal meningitis reported before 1909; Strumia and Kohlhas (1933) cite 38 cases reported; while Bradford and Kelley (1933) add 1 of their own cases to a review of 20 and emphasise the lack of convincing identification of the organism in some cases.

Branham et al. (1938) divide the reported cases roughly into two clinical groups: meningitis in adults, with or after gonorrhœa, and meningitis in the newborn. They say that in the National Institute of Health, Washington, D.C., 10 out of 500 cultures sent for meningococcal typing proved to be gonococcal; 5 of these cultures were from C.S.F. and 5 from blood. In 5 cases the patients were known to have had gonorrhœa. One of the others was a virgin, aged 16, with no history of exposure to gonorrhœa. They also mention a case of apparently primary gonococcal septicæmia uncomplicated by meningitis in a nurse.

In identifying the gonococcus Branham et al. (1938) laid stress on the importance of cultural features, type of colony, and fermentation reactions, stating that only 4 of about 1000 strains of meningococci appeared to ferment dextrose only. They pointed out, however, that some meningococci show an initial lag in the fermentation of maltose. They claimed that the alkali solubility test of Thomson is of value but not absolutely reliable; complete and rapid solution of the suspension always indicated a gonococcus, but some gonococci behave like meningococci. In the differentiation of gonococci from meningococci they had found serum agglutinations almost valueless: gonococci were well agglutinated by polyvalent antimeningococcal serum. Most gonococci were agglutinated more strongly by type 2 antimeningococcal serum than by other type serum, but there was considerable cross-agglutination in some cases. It is significant that the only non-gonococcal disease in which the gonococcal complement-fixation test may be positive is cerebrospinal meningitis. For this reason, and because they had found apparently primary cases of gonococcal meningitis, these workers considered that this type of meningitis is more common than is realised.

In our present case reliance for recognition of the organism was placed on cultural characteristics and fermentation reactions. These, with the sequence vulvovaginitis, peritonitis, meningitis, appear sufficiently conclusive.

Several points of clinical interest arise from our case:

(1) The meningitis was mild. At no time was there much meningism or severe headache, and the child never vomited or showed mental changes, whereas meningitis due to other organisms in children of this age usually gives a more striking clinical picture. However, this may have been the result of the early detection of the meningitis and the speedy application of intrathecal penicillin, and perhaps of the mild sedation with pentobarbital.

(2) The development of metastatic meningitis while the child was on large intramuscular doses of penicillin was probably due to the fact that the gonococci had already gained access to the central nervous system by the time therapy was started, and continued to proliferate there, protected by the relative blood-brain and blood-liquor barrier to penicillin, which, carrying a negative charge, does not normally pass from the blood to the nervous system, though pathological conditions—e.g., frankly purulent meningitis—may facilitate such passage. The access of the organisms to the blood-stream may have been spontaneous or the result of surgical trauma.

(3) The low-grade pyrexia persisted after the infection had apparently been controlled clinically. Whether the final improvement and recovery were helped or accomplished by sulphamezathine is difficult to say, though the chart (see figure) suggests it. However, the second lumbar puncture two days before the exhibition of sulphamezathine seems to show that intrathecal penicillin was effective against the meningitis.

SUMMARY

A case of gonococcal meningitis following vulvovaginitis and peritonitis in a child aged 6 years was successfully treated with penicillin and sulphamezathine.

We are indebted to Brigadier C. H. K. Smith, director of medical services, C.M.F., for permission to publish this article; Lieut.-Colonel M. F. H. Kelleher, M.C., adviser in medicine, C.M.F., for his helpful criticism and encouragement; and Lieut.-Colonel T. E. Field, R.A.M.C., for his coöperative good will.

REFERENCES

Bradford, W. L., Kelley, H. W. (1933) *Amer. J. Dis. Child.* **46**, 543.
Branham, S. E., Mitchell, R. H., Brainin, W. (1938) *J. Amer. med. Ass.* **110**, 1804.
Henderson, G., Ritchie, W. T. (1909) *Rev. Neurol. Psychiat.* **7**, 75.
Strumia, M., Kohlhas, J. J. (1933) *J. infect. Dis.* **53**, 212.

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DETERMINATION OF HÆMOGLOBIN

IV. A COMPARISON OF METHODS FOR DETERMINING IRON CONTENT AND OXYGEN CAPACITY OF BLOOD

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THE relation between the iron content of hæmoglobin and its oxygen capacity has been the subject of much investigation over many years. Peters (1912) was the first to produce convincing evidence that the theoretical relationship held good. He used hæmoglobin solutions made from the washed cells of several different animal species, the Barcroft oxygen-capacity method, and the newly developed accurate titanous chloride titration method for determining iron. He found an average specific oxygen capacity of 393, which is 2% lower than the theoretical figure of 401·3 (22·4 litres of O_2 per atom Fe, 55·85 g.), the difference being within his experimental error. Since then many workers have studied different iron and oxygen-capacity methods on both whole blood and laked cells.

The Van Slyke oxygen-capacity method, in which the gases are removed in a partial vacuum, has come to be regarded as standard. Compared with it, other methods for determining oxygen capacity give results which are often appreciably lower (Van Slyke and Stadie 1921, Bierring et al. 1936). Gibson (1943) found that the Barcroft apparatus would give oxygen-capacity results agreeing with Van Slyke only if the estimations were done in neutral solution and special precautions were taken to determine and correct for reabsorption of oxygen. He found the error due to these factors to be higher for whole blood than for laked cells. Ramsay (1944b) found that higher results could often be obtained with the Van Slyke technique if the blood was first reduced with a buffered titanium solution before oxygenation. In horse bloods the differences were surprisingly large; at that time he thought they might be due to methæmoglobin (cf., however, Ramsay 1946).

Peterson (personal communication) has found that the efficacy of saponin in laking blood is much affected by the age of the blood sample. Saponin preparations vary; and, though a saponin solution, in the concentration recommended by Van Slyke, may be adequately effective when used with bloods that have stood for some hours, it is not necessarily effective with freshly drawn samples in which the red cells are not so fragile. One blood sample that had stood for three days gave its full oxygen-capacity value even when saponin was omitted; whereas for a freshly drawn sample from the same subject a good saponin preparation was no more than adequate in the recommended concentration.

Some form of titanous titration still appears to be the most accurate method of determining iron in blood. Klumpp (1934) keeps the unstable titanous sulphate or chloride solution in an inert atmosphere, whereas Delory (1943) describes a modification in which this is unnecessary. Another technique for avoiding this difficulty is mentioned in the present paper.

It is obvious that in equating iron to oxygen there are difficulties other than those of the analytical methods used. The presence of methæmoglobin (Ammundsen 1941) or carboxyhæmoglobin would lead to low figures for oxygen capacity. Carbon monoxide capacity after reduction, or Ramsay's "total hæmoglobin" method, should under these conditions approximate more nearly to the true hæmoglobin value. The estimation of iron in whole blood will give values for hæmoglobin that are very slightly too high—i.e., by the amount of iron present in serum. This very small error is eliminated by working with laked washed cells. Barkan and Walker (1940a and b) have reported experiments which may indicate that a small proportion of the pigment iron in blood behaves differently from the rest, being "easily split" by incubation with dilute acid; they consider that this may be non-hæmoglobin iron. It also appeared from experiments of Macfarlane and O'Brien (1944) that there might be in men's blood a small amount of an iron-containing pigment (not capable of carrying oxygen) which is not present in women's blood. Later investigations (Gibson and Harrison 1945, King et al. 1947), however, indicate that the average specific oxygen capacity is the same for both male and female bloods.

The above considerations render it difficult to decide arbitrarily on a method for determining the absolute amount of hæmoglobin in blood. In general it might be expected that oxygen-capacity methods would tend to give slightly lower results than methods based upon the estimation of iron, and that the true value lies somewhere between the two figures.

In the present investigation a considerable number of methods have been tested. The titanous chloride iron method has been used in several variations, by analysts in London, Oxford, and Edinburgh, on the same bloods. A potassium dichromate titration method and an 8-hydroxyquinoline semi-micro gravimetric method have also been used to determine iron. Oxygen capacities by the Van Slyke technique have been done in London, Cardiff, Edinburgh, and Oxford, and "total hæmoglobin" after reduction with titanous citrate in Edinburgh. The effect of the substitution of a synthetic detergent for saponin in the Van Slyke method has been investigated. Further, oxygen capacities with the Warburg apparatus with either saponin or the detergent have been performed. Carbon monoxide capacities before and after reduction with sodium hydrosulphite have been done in Oxford. A series of 35 pig bloods, 2 cow bloods, 6 human bloods, and 3 mixed specimens of pathological human bloods from the laboratory has been investigated. It was impossible to perform every type of estimation on every blood.

Colorimetric hæmoglobin estimations on these bloods will be reported in another communication. This paper is confined to the iron, oxygen, and carbon monoxide methods studied.

Methods

Collection of Blood.—Fresh blood collected in London was treated with potassium oxalate as anticoagulant, and samples from the carefully mixed stock were sent immediately by post to Edinburgh, Cardiff, or Oxford as required. Several additional bloods were collected and tested at Oxford only. The pig bloods were obtained from freshly slaughtered animals through the courtesy of Messrs. T. Wall and Sons. The bloods in table v were collected in Oxford, and heparin was used as anticoagulant.

IRON METHODS

Edinburgh (Titanous Titration).—A micro-titrimetric procedure has been followed, using titanous sulphate as reducing agent (Ramsay 1944a, 1946), the solution being stored under hydrogen.

Oxford.—The iron determinations in Oxford were done essentially by the Klumpp (1934) technique.

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London (Original Method).—These have been carried out by a modification of the Delory (1943) technique. Details are as follows:

Duplicate 5 ml. samples of blood from a pipette calibrated "to contain" are washed into 50 ml. 'Pyrex' beakers. Conc. HNO_3 (0·5 ml.) is added and the mixture evaporated slowly to dryness over a small flame or in an oven, the beaker being covered with a circle of filter-paper. It is then heated more strongly until all fuming ceases, and ashed at 400°C overnight in a muffle furnace. The product, a readily soluble ferric ash, is dissolved by warming with a few ml. of conc. HCl and diluted to 10–15 ml. with water. Two 5 ml. portions of standard iron solution (≡2·5 mg. Fe+++) are washed into similar beakers from the same pipette (to avoid pipette corrections).

The titanous chloride solution is prepared by dilution of commercial (12·5% w/v) reagent. Distilled water is boiled vigorously for 10 min. and then saturated with CO_2 by passing a rapid stream through the water while it is cooled under the tap. A suitable quantity of the reagent * (0·5–2 ml., depending on the age and condition of the reagent) is placed in a 100 ml. volumetric flask containing 2 ml. of conc. HCl and diluted to volume with the prepared water. After mixing, a 50 ml. burette is filled, the excess run out to the zero graduation, and the titrations begun at once. All titrations are completed with the original filling. (Further solution is never added to the burette, a fresh burette full being used for each set of titrations.)

One of the iron standards is titrated first. Indicator (0·5 ml. of 20% KCNS) is added and the titanous chloride run in until the red colour is discharged. Titration is proceeded with as rapidly as possible; but since the reaction between $TiCl_3$ and iron is not instantaneous, care must be taken to avoid overtitration. The duplicate blood solutions are next titrated, followed by the second standard. The titrations of the two standards differ usually by not more than 0·1 ml., the difference being caused by the slow oxidation of the titanous chloride solution. The average standard titration is taken as the basis for calculating the iron content of the blood samples.

TABLE I—AGREEMENT BETWEEN DIFFERENT ANALYSTS AND VARYING TECHNIQUES FOR THE ESTIMATION OF IRON IN PIG, COW, AND HUMAN BLOODS BY TITANOUS TITRATION (RESULTS EXPRESSED AS ML. OF O_2 PER 100 ML. OF BLOOD)

Type of blood	No. of blood	$TiCl_3$ (London) ashed with—				$TiCl_3$ (Oxford) ashed with—			Titanous sulphate (Edinburgh)
		HNO_3	HCl	H_2SO_4	HCl + H_2O_2	H_2SO_4	HNO_3	HCl	
Pig	10	19·9	19·9	19·6	..	..	..	..	..
,,	11	16·7	16·6	16·6	16·7	..	..	..	..
,,	12	20·0	20·1	20·2	..	..	..	..	..
,,	13	21·6	21·7	22·2	..	..	..	..	..
,,	14	19·2	19·4	19·4	19·2	..	..	..	..
,,	26	23·2	..	..	..	22·8	22·9	..	..
,,	27	24·2	..	..	..	24·1	24·1	..	..
,,	28	16·6	..	..	..	16·6	16·8	..	16·4
,,	29	17·6	..	..	..	17·3	17·4	..	..
,,	30	18·8	..	..	..	18·7	18·8	..	..
,,	31	20·4	..	..	..	20·3	20·3	..	21·5
,,	32	17·8	..	..	..	..	..	..	17·9
,,	33	21·3	..	..	..	..	..	..	21·8
,,	34	21·4	..	..	..	..	..	..	20·0
,,	35	17·5	..	..	..	..	..	..	16·8
Human	1	16·9	..	..	..	17·1	17·1	..	..
,,	2	16·1	..	..	..	16·2	16·3	..	..
,,	3	18·0	..	..	..	17·1	17·9	..	..
,,	4	17·4	..	..	..	17·7	17·7	..	..
,,	5	17·9	..	..	..	17·8	17·2	..	..
,,	6	..	..	..	..	14·1	14·0	14·0	..
,,	7	..	..	..	..	14·1	14·1	14·2	..
Mxd. human	1	14·7	14·7	14·5	14·5	..	..	..	..
,,	2	17·8	17·8	17·8	17·7	..	..	..	..
,,	3	15·0	14·8	14·9	14·9	..	..	..	..
Cow	1	..	..	..	..	16·6	16·6	16·4	..
,,	2	..	..	..	..	16·9	16·9	16·9	..

* This is chosen to give a titration of about 10 ml. for 5 ml. standard iron solution.

London (Modified Method).—More recently a modification of the above method has been used, making the titration easier and more precise:

The blood ash is prepared as described earlier; it is then dissolved by warming in 5 ml. conc. HCl, and the solution is diluted to 20 ml. with distilled water. The iron standards (5 ml.) are also diluted to 20 ml. Just before their titration, 1 ml. of 20% KCNS is added to these solutions.

TABLE II—ESTIMATION OF NITRITE IN BLOODS ASHED WITH NITRIC ACID

Type of blood	Pig			Human mixed		
	1	2	3	1	2	3
Nitrite in total sample (µg. $NaNO_2$) ..	0·5	0·5	0·25	1·0	1·0	0·5

Titration is carried out by means of the 'Micrometer Syringe Apparatus' (Burroughs Wellcome & Co.) which comprises a 1 ml. all-glass syringe driven by a micrometer screw (Trevan 1925) and provided with a bent capillary outlet with a turned-up end. Since the diameter of the plunger and the bore are uniform, volumes of liquid are delivered from the syringe proportional to the movement of the screw. (It has been found that the glass parts of the apparatus may be replaced, without loss of accuracy, by a tuberculin syringe with fused-on glass capillary outlet.)

The titration beakers are fixed in a stand; the syringe and micrometer are mounted horizontally; the outlet of the syringe and a narrow tube passing CO_2 into the solution for stirring dip under the surface of the liquid. The syringe is filled with the undiluted commercial $TiCl_3$ reagent; one filling of the syringe is sufficient for 6–8 titrations.

Under these conditions, the titrations may be done slowly and the end-point is stable. During testing, series of eight successive volumes of standard iron solution have been titrated, the difference between the greatest and least titration figures being less than 0·2%.

Standard.—Pure ferric ammonium sulphate (43 g. per litre) is dissolved in water with the aid of sufficient conc. HCl. This stock solution contains about 5 mg. of Fe per ml. and keeps indefinitely. It is standardised by iodimetric titration against $Na_2S_2O_3$ (Treadwell and Hall 1930). The working standard is a tenfold dilution of this, and is compared by $TiCl_3$ titration with an acid solution of iron wire (99·7% pure). The two methods of standardisation have agreed to within 1 part in 650.

Methods of Ashing.—Variations in the ashing techniques have been tested in London by substituting other acids (HCl and H_2SO_4) for nitric acid, and proceeding otherwise as usual. In some cases peroxide was used, a few drops of 100 vol. H_2O_2 being added to the HCl-dried product and evaporated off again before ashing. In Oxford the substitution of nitric or hydrochloric acid in the Klumpp technique has been tried.

Effect of Nitrates, Nitrites, Salts, and Plasma.—Nitrite has been estimated quantitatively in the ash of a number of blood samples by the diazo method recommended by The British Drug Houses Ltd. for use in the Lovibond Nessleriser. The effect on the titrations of various amounts of nitrite added to standards has been observed. Nitrates, salts, and plasma added to standards have also been tested.

Potassium Dichromate Iron Method.—This has been adapted directly from the method of Bernhart and Skeggs (1943) for the determination of iron in crystalline hæmoglobin:

To 25 ml. of blood in a pyrex or silica beaker, 2 ml. of concentrated sulphuric acid is added, and the mixture is evaporated slowly to dryness in an oven at about 100°C, after which it is ashed overnight in a muffle furnace at 400°C. The ash is dissolved in 2 ml. of 12*N* HCl, and further treatment and the dichromate titration conducted according to Bernhart and Skeggs.

The potassium dichromate solution is standardised against the standard iron solution used for titanous

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chloride determinations; thus the results obtained are directly comparable with the titanous chloride results in terms of the same iron standard.

Hydroxyquinoline Iron Method.—This semi-micro method is based on the work of Berg (1929). The details are as follows:

In a pyrex or silica beaker 25 ml. of blood is treated with 1 ml. of concentrated HNO_3, evaporated, and ashed as described for the titanous chloride method. The ash is dissolved in 2 ml. of concentrated HCl and 2 ml. of water by warming. The solution is then transferred quantitatively to a centrifuge tube, the beaker being washed out with 0·1*N* HCl (three portions each of about 3 ml.); 15 ml. of 2*N* NaOH is added, which gives a final concentration of about 0·1*N* NaOH. Ferric hydroxide is precipitated. (Copper, which may react with hydroxyquinoline under the conditions used, remains in solution and is removed.) The precipitate is spun down, the supernatant fluid discarded, and after two washings with 0·1*N* NaOH, the separated ferric hydroxide is dissolved in 2 ml. of concentrated HCl and 2 ml. of water.

The solution is transferred quantitatively to a beaker and diluted to 20 ml.; concentrated NH_4OH is then added drop by drop till no further precipitate forms. One drop of 100 vol. H_2O_2 is added, followed by 0·5 ml. of concentrated HCl, and the mixture is stirred well after each addition. Glacial acetic acid 8 ml. is then added, and, after mixing, 5 ml. of 4% 8-hydroxyquinoline solution, followed immediately by 5 g. of sodium acetate dissolved in 20 ml. of water. After thorough mixing, the solution is allowed to stand for 15 min., then warmed till the precipitate coagulates. The mixture is filtered through a dried weighed Gooch crucible, or sintered glass crucible covered with a layer of asbestos. The precipitate is washed thoroughly with water, dried overnight at 120°C, and weighed. The precipitate—$Fe(C_9H_6ON)_3$—contains 11·44% Fe.

Reagent.—4% 8-hydroxyquinoline is prepared by dissolving 4 g. of the solid in the least possible amount of glacial acetic acid and diluting to nearly 100 ml. with water. Dilute NH_4OH is added until a faint permanent cloud is formed, and then acetic acid drop by drop until the solution clears. It is then made to volume.

TABLE III—EFFECT OF NITRITE ON TITRATION OF IRON STANDARDS WITH TITANOUS CHLORIDE

Analyst	Amount of $NaNO_2$ added (µg.)	Titrations of standard (averages) (ml.)				Difference (%)
		Alone		+ $NaNO_2$		
M. G.	2	11·33	11·33	11·30	11·30	−0·26
K. G.	2	11·25	11·20	11·15	11·18	−0·45
K. G.	5	12·20	12·25	12·18	12·22	−0·16
K. G.	10	11·70	11·60	11·60	11·55	−0·60
K. G.	25	11·90	11·98	12·10	12·13	+1·5
M. G.	50	7·73	7·94	8·02	8·02	+2·25

Analyst	Amount of $NaNO_2$ added (µg.)	Alone	+ $NaNO_2$	Difference (%)
M. G.	2	11·33 11·33	11·30 11·30	−0·26
K. G.	2	11·25 11·20	11·15 11·18	−0·45
K. G.	5	12·20 12·25	12·18 12·22	−0·16
K. G.	10	11·70 11·60	11·60 11·55	−0·60
K. G.	25	11·90 11·98	12·10 12·13	+1·5
M. G.	50	7·73 7·94	8·02 8·02	+2·25

Analyst	Amount of $NaNO_2$ added (µg.)	Titrations of standard (averages) (ml.)				Difference (%)
		Alone		+ $NaNO_2$		
M. G.	2	11·33	11·33	11·30	11·30	−0·26
K. G.	2	11·25	11·20	11·15	11·18	−0·45
K. G.	5	12·20	12·25	12·18	12·22	−0·16
K. G.	10	11·70	11·60	11·60	11·55	−0·60
K. G.	25	11·90	11·98	12·10	12·13	+1·5
M. G.	50	7·73	7·94	8·02	8·02	+2·25

GASOMETRIC METHODS

Van Slyke Oxygen Capacity.—The method of Van Slyke and Neill (1924) has been used in London, Cardiff, Oxford, and Edinburgh. For tests of the synthetic detergent the ferricyanide reagent is made up to contain 0·1% of M.1773 † instead of saponin. This gives a rather turbid suspension.

"*Total Hæmoglobin.*"—These determinations have been performed in Edinburgh according to the titanous citrate technique on the Van Slyke machine (Ramsay 1944b).

Carbon Monoxide Combining Capacity.—The method of Van Slyke and Hiller (1929) for CO-capacity, before and after reduction with hydrosulphite, has been used at Oxford, with the modification that a conc. urea solution was used in place of water (Rappaport and Köck-Molnar 1934). The urea solution prevents the precipitation of protein and keeps the apparatus clean.

† M.1773, a technical product consisting mainly of sodium oleyl sulphate, was kindly supplied by Imperial Chemical Industries Ltd.

TABLE V—COMPARISON OF IRON, OXYGEN, AND CARBON MONOXIDE CAPACITY METHODS ON HUMAN BLOODS (RESULTS EXPRESSED AS ML. OF O_2 PER 100 ML. OF BLOOD)

Human blood (female) no.	Iron methods			Oxygen-capacity methods				Carbon monoxide capacity (Oxford)	
	London		Oxford	Van Slyke			Warburg		
	$TiCl_3$	8-hydroxyquinoline	$TiCl_3$	London	Cardiff	Oxford	London	Before reduction	After reduction
1	16·9	17·2	17·1	16·5	16·4	..	16·3	16·3	16·7
2	16·1	16·2	16·3	..	15·7	..	15·6	15·6	15·8
3	18·0	17·0	17·5	..	17·5	17·4	17·8	17·1	17·6
4	17·4	17·3	17·7	17·4	17·5	17·2	16·6	16·6	17·6
5	17·9	17·4	17·4	17·6	17·3	17·2	18·1	17·2	17·8
6	17·5	17·3	18·3	17·2	17·1	17·1	16·7	17·4	17·4

Warburg Oxygen Capacity.—The Warburg apparatus has been adapted for oxygen-capacity determinations by a technique similar to that used by Gibson (1943) on his Barcroft manometers. One empty flask with its manometer is used as a thermobarometer. The usual water-bath is maintained at room temperature in a room where the variations in temperature are slight. Two or more flasks with their manometers are set up as follows:

In the centre compartment is placed 0·1 ml. of 2*N* KOH and a roll of filter-paper, and in the side-arm 0·2 ml. of freshly prepared saturated potassium ferricyanide solution. In the main body of the flask is put 0·1 ml. of freshly prepared saponin solution (containing 20 mg. saponin per ml.) and 1·5 ml. of distilled water. Into this is washed 0·5 ml. of fully oxygenated blood from a pipette calibrated "to contain." The flasks are attached to their manometers (soft paraffin is a suitable lubricant at room temperature) and placed in position in the water-bath. They are shaken with the manometer stoppers open to the air for 10 min., the meniscus adjusted to the zero mark, the stoppers closed, and the apparatus shaken for a further 10 min. or until it is evident from the constancy of the meniscus that equilibration is complete. The right-hand meniscus is then adjusted to the zero mark on each manometer, and the reading of the left-hand meniscus noted.

The ferricyanide is mixed with the blood by carefully tipping each manometer; each is replaced in the bath, and the apparatus is shaken for 15 min. from the time of mixing. The right-hand meniscus of each flask is again adjusted to zero and the left-hand meniscus read. The shaking is continued for a further 30 min., and the final readings are taken.

The calculation involves the recognition of the presence of two opposing factors: (1) the release of oxygen from oxyhæmoglobin by the action of ferricyanide; and (2) a small and continuous absorption of oxygen by the blood mixture. The release of oxygen is complete in the first 15 min. To correct for the absorption of gas which is masked by the main reaction, the shaking is continued for a further 30 min. During this period the manometer shows a slight fall (all changes are first corrected for any alteration in temperature or pressure shown by the thermobarometer), and half of this fall is assumed to represent the absorption of oxygen during the first 15 min. This is added to the increase obtained between 0 and 15 min., giving the true increase due to release of oxygen. Multiplication of this height in mm. by the factor for O_2 for the individual flask at the temperature of the experiment gives the volume of gas produced, from which the oxygen capacity of the blood is calculated.

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'White saponin' manufactured by F. E. Becker & Co. has been used. The quality of the saponin and the freshness and concentration of the solution are most important in this determination. Poor saponins often give low results. In the experiments with M.1773, 0·1 ml. of a freshly prepared suspension of M.1773 (7·2 mg. per ml.) was substituted for the saponin.

Results

The results are collected in tables I–V. The results of iron determinations have been expressed as ml. of O_2 per 100 ml. of blood (assuming the theoretical relationship of iron to oxygen—i.e., 55·85 mg. Fe ≡ 22·4 ml. of O_2) for easier comparison with the oxygen methods. Each figure given is the average of duplicate, sometimes triplicate, estimations.

TITANOUS IRON METHODS

Table I shows that the over-all agreement among the different titanous titration methods for the estimation of iron in blood is very good indeed.

The use of different acids in the preliminary treatment before ashing was tested on 8 bloods in London and on 15 bloods in Oxford. No significant difference is found when HNO_3 is replaced by HCl ($t=0·244$; $P>0·8$) or by H_2SO_4 ($t=0·159$; $P>0·8$), and it seems to be immaterial which acid is used. The agreement between the modified Delory procedure performed in London and the Klumpp technique applied in Oxford is excellent; 6 pig bloods and 5 human bloods were done in this series. The agreement with the titanous sulphate procedure used in Edinburgh on 6 of the pig bloods is not quite so good. On one blood good agree-

TABLE IV—COMPARISON OF IRON, OXYGEN, AND CARBON MONOXIDE CAPACITY METHODS ON FRESH PIG BLOODS (RESULTS EXPRESSED AS ML. OF O_2 PER 100 ML. OF BLOOD)

Blood no.	Iron methods			O_2-capacity methods						CO-capacity	
				Van Slyke				Warburg		Van Slyke	
	London			London		Edinburgh		London		Oxford	
	$TiCl_3$	$K_2Cr_2O_7$	8-Hydroxy-quinoline	Saponin	M.1773*	Saponin	Total O_2†	Saponin	M.1773*	Before reduction	After reduction
1	19·7	19·8	..	..	..	..	..	..	..	..	..
2	19·1	18·7	..	..	..	..	..	..	..	..	..
3	22·9	22·7	..	..	..	..	..	..	..	..	..
4	17·0	17·0	..	..	..	..	..	..	..	..	..
5	25·3	25·1	..	24·6	..	..	..	..	..	..	..
6	24·5	24·5	24·0	24·0	..	..	..	..	..	..	..
7	22·2	22·2	..	21·4	..	..	..	..	..	..	..
8	22·3	22·3	22·4	21·3	..	..	..	..	..	..	..
9	19·1	19·1	..	18·5	..	..	..	..	..	..	..
10	19·9	20·3	19·9	19·7	..	..	..	..	..	..	..
11	16·7	..	16·4	16·3	..	..	..	..	..	..	..
12	20·0	..	19·5	19·5	..	..	..	..	..	..	..
13	21·6	..	22·0	20·9	..	..	..	..	..	..	..
14	19·2	..	19·9	19·2	..	..	..	..	..	..	..
15	21·1	..	20·7	19·9	..	..	..	19·9	..	..	..
16	21·9	..	..	21·7	..	..	..	20·6	..	..	..
17	21·1	..	22·7	20·7	..	..	..	20·8	..	..	..
18	24·2	..	24·7	23·0	..	..	..	23·2	..	..	..
19	24·3	..	24·4	23·3	..	..	..	23·1	..	..	..
20	20·2	..	20·3	19·4	19·8	..	..	19·1	18·7	..	..
21	..	..	..	17·3	18·0	..	..	18·1	..	..	..
22	26·0	..	25·1	24·5	24·0	25·2	25·5	24·3	24·7	..	..
23	23·4	..	23·3	21·8	21·0	22·8	22·7	21·7	21·7	..	..
24	24·4	..	24·1	23·1	24·0	24·0	24·2	23·9	21·8	..	..
25	21·3	..	20·7	20·1	20·3	20·6	20·7	20·2	21·0	..	..
26	23·2	..	22·2	21·9	22·2	22·3	22·2	21·2	20·9	..	..
27	24·2	..	..	23·2	23·4	23·6	23·8	22·3	22·2	..	..
28	16·6	..	..	16·3	16·4	16·2	16·4	14·8	15·3	16·2	16·4
29	17·6	..	17·9	17·0	17·4	17·0	17·5	16·0	17·0	17·0	17·2
30	18·8	..	18·4	17·8	17·4	18·2	18·4	18·1	17·6	17·4	18·5
31	20·4	..	21·0	20·7	..	19·5	19·5	18·6	18·6	..	..
32	17·8	..	..	..	..	16·8	17·3	..	..	..	..
33	21·3	..	..	..	..	20·7	21·5	..	..	..	..
34	21·4	..	..	..	..	20·1	20·3	..	..	..	..
35	17·5	..	..	..	..	15·6	15·8	..	..	..	..

* Synthetic detergent. † After treatment with titanous citrate (Ramsay 1944b).

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ment was obtained between all three methods; on another the titanous sulphate is higher than the other two; on the remaining 4 bloods only a comparison with the London technique is available: 2 show good agreement, and 2 are lower than the London figures. The reasons for these few discrepancies have not been determined, but it should be borne in mind that the technique used in Edinburgh is on a very micro scale.

Tables II and III show that the amount of nitrite present in samples of blood ashed after the addition of nitric acid is far below the level at which nitrite begins to interfere with the titanous chloride titration. This confirms the results obtained by ashing with different acids.

As much as 0·15 g. of KNO_3 added to standards had no effect on the titration. The addition of 45 mg. of KNO_3 and 40 mg. of NaCl to standards likewise had no effect. The addition of 5 ml. of ashed plasma to standards produced a slight increase in titration amounting to 0·6% of the total. This may be attributed to plasma iron.

POTASSIUM DICHROMATE AND HYDROXYQUINOLINE IRON METHODS

These methods were tested in London. Titanous chloride iron estimations were performed on 34 pig bloods and 6 human bloods, and the hydroxyquinoline technique on 20 of the pig bloods and the 6 human bloods (see tables IV and V).

The agreement between titanous chloride and potassium dichromate iron estimations is excellent. Since both methods are referred to the same ferric iron standard, this agreement indicates that both are reliable for the accurate estimation of iron in blood.

The agreement of the semi-micro gravimetric hydroxyquinoline method with the titanous chloride method, though not quite so consistent, is on the whole very satisfactory. Differences range equally up and down; and, since it is a gravimetric technique, this supplies an additional check on the absolute value of the iron standard. (Analysis of this standard by the hydroxyquinoline method gave 100·4, 101·0, and 100·7% of the iron content as determined by the original standardisation against pure iron wire.) The hydroxyquinoline method should probably be considered to be slightly less reliable than the other two iron methods.

GASOMETRIC METHODS

Van Slyke Oxygen Capacity.—In tables IV and V it will be seen that Van Slyke oxygen-capacity determinations were done in London on 27 pig bloods and 4 human bloods; in Cardiff on 6 human bloods; in Oxford on 4 human bloods; and in Edinburgh on 14 pig bloods. The agreement between the different analysts is usually good. Since the blood samples had to be sent through the post, the position with regard to these comparative estimations is very satisfactory.

A comparison of the oxygen capacities obtained by the Van Slyke method with those calculated from the iron analyses shows a distinct tendency for the former to be slightly lower. In one or two cases the values are the same, but in no case is oxygen capacity greater than iron. The average discrepancy for 26 pig bloods is 0·7 ml. of O_2 per 100 ml. or about 3·5% of the total oxygen. The average difference for 6 human bloods amounts to 0·4 ml. of O_2 or 2·0%. The discrepancy may be the result of the action of any or all of the factors previously mentioned which would tend to make iron high or oxygen low.

"*Total Hæmoglobin.*"—14 comparisons between Van Slyke oxygen capacity and the "total hæmoglobin" method of Ramsay (1944b) were done in Edinburgh. The latter values are very slightly higher. The discrepancy for pig's blood is not very great, averaging 0·23 ml. of O_2 or just over 1%.

Warburg Oxygen Capacity.—In all, 23 comparisons of oxygen capacities performed on the Warburg apparatus with the Van Slyke technique are available. The results are in substantial agreement, but the scatter of the Warburg estimations is greater than one might wish. There is also a tendency to lower results, which might possibly be expected of a method performed at atmospheric pressure. On the whole, the technique used gives results similar to the Van Slyke but of a lower order of accuracy. This was also reflected in a greater difference between duplicates.

Use of a Synthetic Detergent (M.1773).—The effect of substituting M.1773 for saponin in the Van Slyke method was tested on 11 pig bloods and on several human bloods (Oxford). No significant differences in results were observed. A "concentration-laking time" curve was constructed using a single freshly drawn blood sample from a pig and aqueous suspensions of M.1773. At room temperature the laking time for concentrations less than 0·01% was indefinitely long, whereas for concentrations greater than 0·05% the laking time was less than 10 sec. A concentration of 0·02 in the Van Slyke ferricyanide reagent was the minimum that gave the same oxygen-capacity value as an adequate concentration of saponin. Though such a substance has theoretical advantages over saponin, it had the practical disadvantage in the London and Cardiff experiments of making the apparatus much more difficult to clean after an estimation. The Oxford workers, however, found that the use of the detergent did not dirty the apparatus, and M.1773 ferricyanide solution could be kept much longer than the saponin ferricyanide without loss of activity. Use of this reagent, instead of saponin, in the Warburg apparatus also had no effect on the results. Here there is no objection to it from the point of view of cleaning the flasks.

Carbon Monoxide Combining Capacity.—CO-combining capacities, before and after reduction with hydrosulphite, were measured on 6 human bloods and 3 pig bloods. Some of these show a slight increase in CO-capacity after reduction, but 1 human and 1 pig blood show pronounced differences. In the case of the human blood 4, the CO-capacity before reduction is considerably lower than the oxygen capacity. No methæmoglobin could be detected spectroscopically in bloods 4 and 6 at 1 : 3 dilution.

Discussion

One of the purposes of this investigation was to establish the validity of the use of accurate iron and gasometric methods as base-lines for the estimation of hæmoglobin—fundamental estimations to which colorimetric methods could be referred. This purpose appears to have been achieved.

The titanous chloride method in several forms, and in the hands of three different analysts, has given results for iron in excellent agreement. In addition, a potassium dichromate method, based on a completely different titration principle, agrees precisely with the titanous chloride method, and very substantial agreement is also shown by a micro-gravimetric hydroxyquinoline technique. Thus the estimation of iron in blood is in a very satisfactory position.

Agreement has been obtained between three different analysts performing Van Slyke oxygen-capacity determinations on the same bloods; oxygen-capacity results are lower than the theoretical equivalent of iron by 3·6% in pig blood and 2·0% in human blood. This difference is probably due to a combination of effects: (1) the presence of non-oxygen-carrying pigment, such as methæmoglobin and carboxyhæmoglobin, lowering the oxygen capacity; and (2) the presence of iron, free or attached to inactive pigment, raising the iron results

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in proportion. In estimating hæmoglobin one presumably wishes to measure the total pigment which potentially may carry oxygen (since most temporarily inactive forms of hæmoglobin can regenerate), and from this point of view it is probably better to take iron estimations as the standard base-line. At any rate they seem to be subject to less fluctuation than are oxygen-capacity determinations. In this series of determinations the Ramsay "total hæmoglobin" method, which includes methæmoglobin, raises the Van Slyke figure to a closer approximation to the iron value, but does not completely remove the discrepancy. This may indicate that the latter is not entirely explicable in terms of methæmoglobin.

Summary

Excellent agreement was found on the same specimens among three different teams of analysts who used variations of the titanous chloride titration method for estimating blood-iron. A potassium dichromate iron-titration technique and a hydroxyquinoline micro-gravimetric iron method agree well with the titanous chloride procedure.

Van Slyke oxygen-capacity results, obtained by three different analysts, agreed and were on an average 3·5% or 0·7 ml. of O_2 per 100 ml. of normal pig blood lower than the oxygen capacity calculated from iron analysis. For human blood the difference averages 2·0% or 0·4 ml. of O_2.

An average difference of 1·1% or 0·23 ml. of O_2 was found between Van Slyke oxygen capacity and Ramsay's "total hæmoglobin" method on 14 pig bloods.

The Warburg apparatus may be used to measure oxygen capacity. It is less accurate than the Van Slyke method.

No advantage was found in the substitution of a synthetic detergent for saponin in oxygen-capacity estimations.

The carbon monoxide combining capacities of 6 human and 3 pig bloods were determined before and after reduction with sodium hydrosulphite. Some of these showed a slight increase in carbon monoxide capacity after reduction; two specimens showed a pronounced difference.

This investigation has been carried out for the Medical Research Council's subcommittee on analytical methods. The expenses incurred were partly defrayed by a grant from the Council, to whom grateful acknowledgment is made.

Our thanks are due to Dr. C. R. Harington, F.R.S., chairman of the subcommittee on analytical methods, for much valuable advice; and to Miss K. Glaser, Mr. A. Hoffler, and Mr. W. Weedon for valuable technical assistance.

REFERENCES

Ammundsen, E. (1941) *J. biol. Chem.* **138**, 563.
Barkan, G., Walker, B. S. (1940a) *Ibid*, **135**, 37.
— — (1940b) *Ibid*, p. 803.
Berg, R. (1929) *Z. anal. Chem.* **76**, 193.
Bernhart, F. W., Skeggs, L. (1943) *J. biol. Chem.* **147**, 19.
Bierring, E., Nielsen, A., Nielsen, E. (1936) *Acta med. scand.* suppl. 78, p. 174.
Delory, G. E. (1943) *Analyst*, **68**, 5.
Gibson, Q. H. (1943) *J. Physiol.* **102**, 83.
— Harrison, D. C. (1945) *Biochem. J.* **39**, 490.
King, E. J., Gilchrist, M., Wootton, I. D. P., Donaldson, R., Sisson, R. B., Jope, H. M., Macfarlane, R. G., O'Brien, J. R. P., Peterson, J. M., Strangeways, D. H. (1947) *Lancet*, ii, 789.
Klumpp, T. G. (1934) *J. biol. Chem.* **107**, 213.
Macfarlane, R. G., O'Brien, J. R. P. (1944) *Brit. med. J.* i, 248.
Peters, R. A. (1912) *J. Physiol.* **44**, 140.
Ramsay, W. N. M. (1944a) *Biochem. J.* **38**, 467.
— (1944b) *Ibid*, p. 470.
— (1946) *Ibid*, **40**, 286.
Rappaport, F., Köck-Molnar, K. (1934) *J. biol. Chem.* **104**, 29.
Treadwell, F. P., Hall, W. T. (1930) Analytical Chemistry. New York; vol. II. p. 577.
Trevan, J. W. (1925) *Biochem. J.* **19**, 1111.
Van Slyke, D. D., Hiller, A. (1929) *J. biol. Chem.* **84**, 205.
— Neill, J. M. (1924) *Ibid*, **61**, 523.
— Stadie, W. C. (1921) *Ibid*, **49**, 1.

Medical Societies

NUTRITION SOCIETY

Nutrition in Great Britain

AT an all-day conference on March 13, at the London School of Hygiene, the society discussed the results of recent investigations on nutritional status in Great Britain.

Prof. J. R. MARRACK, speaking of the biochemical methods of assessing nutritional state, said it is unfortunately true that many of the results cannot properly be interpreted because of the lack of uniformity in the methods used. Even a simple determination such as hæmoglobin, perhaps the most important of biochemical methods for determining nutritional status, has been performed by different methods, and the commonest method, using the Haldane apparatus, gives inconsistent results not only when done by different observers but often when repeated by the same observer. Similarly, a great deal of work has been done on the estimation of vitamin A in the blood, but different observers, with the same samples of blood, have found quite different values. Only when the methods are standardised, as has been done for the determination of vitamin-C saturation, can the results of different observers be compared. In so far as it is possible, with these limitations, to draw any conclusions concerning nutritional state since the beginning of the late war, there seems to be no evidence of any increase in anæmia or of any diminution in the intake of vitamin A; on the other hand, the seasonal low intake of vitamin C in the spring seems to have been accentuated.

In dealing with anthropometric and performance tests, Prof. JOHN YUDKIN also confined his remarks largely to the limitations of methods. He pointed out how difficult it is to derive positive conclusions from "static" measurements in individuals. However, it is possible to obtain useful information in the comparison of groups, such as those in which he has demonstrated differences in school-children due to economic and social circumstances. For example, the height, weight, and strength of children vary according to economic circumstances and specifically according to the amount of money available for each member of the family and the number of children in the family. The only way in which anthropometric measurements may be useful in an individual is in a "dynamic" sense—that is, in determining rates of growth. As to performance tests, many have been suggested but no agreement has yet been reached as to which is best. One difficulty lies in the fact that malnourished children may be worse in some types of physical performance but better in others. From the few anthropometric examinations in which comparable measurements were taken during the war, as in the growth of school-children, the general average of the figures available has shown an improvement. In some groups, however, there has been a deterioration, and this fact emphasises the danger of drawing conclusions about the whole population from one or two small groups, as we are often asked to do.

Dr. H. M. SINCLAIR, who discussed the correlation of clinical findings with the results of biochemical, anthropometric, and performance tests, emphasised and extended two further difficulties mentioned by Professor Yudkin. First, clinical examination alone, unless carried out by people specially trained in modern methods of nutritional assessment, is notoriously unsatisfactory, as evidenced by inquiries into the reliability of the examination by school medical officers. Secondly, it is difficult, if not impossible, to dissociate nutritional defects of recent origin from physical states due to past malnutrition or to genetic factors. A first essential is a detailed history. Next, even though some signs are still not definitely attributable to nutritional deficiency, it is useful to record them in our present state of knowledge so that we may find out what they do mean. Some signs have already been shown to have nothing to do with nutritional state, including many which are still being used in Ministry of Health surveys. Dr. Sinclair also mentioned the non-specificity of clinical signs and the fact that

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they often appear late in nutritional deficiency. A high correlation with other measurements cannot always be expected—for example, loss of weight may be avoided by restricting activity. Moreover, correlation does not necessarily imply causal relationship. Again, different types of deficiency will clearly lead to correlation of quite different factors. Dr. Sinclair finally contended that there is no single criterion of nutritional deficiency; only a reasonable assessment of the results of many kinds of test can give a satisfactory diagnosis of deficiency.

In the general discussion that followed these papers, Dr. A. P. Meiklejohn, Dr. H. S. Stannus, and Dr. H. E. Magee agreed that the clinical assessment of nutrition is of greater use and importance than other tests. The two latter, in particular, strongly defended the clinical surveys conducted by the Ministry of Health, even though these are confined to very few signs.

Reviews of Books

Die Diagnostik und Therapie des Nebennierenausfalls und das Krankheitsbild der relativen Nebennierenrindeninsuffizienz (Hypadrenie)

A. KAPPERT. Basle: Schwabe. 1947. Pp. 102. Sw. fr. 8.

IN this small book Dr. Kappert intends to survey modern diagnostic and therapeutic methods in suprarenal cortical insufficiency, particularly in *formes frustes* ("hypadrenie"). It is based mainly on Goldzieher's classic, *The Adrenal Glands in Health and Disease*, published in 1944, and he refers often to the letter of this work if not always to its spirit. Thus acute adrenal cortical failure is called Waterhouse-Friderichsen syndrome regardless of its ætiology or the age of the patient. It should surely bear the name of E. G. Little, who in the *British Journal of Dermatology* in 1901 described 4 cases of his own (and 8 others) of "purpura ending fatally and associated with hæmorrhages into the suprarenal capsules." This was ten years before Waterhouse published his single case of the meningococcal type of adrenal hæmorrhage, and 17 years before Friderichsen added 2 new cases of his own of the same type. The interpretation given of the *formes frustes* of endocrine disorders is attributed to H. Marx although J. Bauer long anticipated him.

The various tests of adrenal cortical function are well discussed. Goldzieher coined the term "benign hypoadrenia" and Dr. Kappert extends Goldzieher's original classification and adds relevant new observations. Among Marañon's practical hints on differential diagnosis he quotes particularly the morning adynamia of the neurotic in contrast to the evening adynamia of hypoadrenia; the cases of benign hypoadrenia due to lack of vitamins and faulty diet are also of interest. The discussion of the treatment of adrenal cortical insufficiency and its complications is full and up to date.

Méthodes statistiques en médecine et en biologie

E. MORICE, professeur, institut de statistique, University of Paris. Paris: Masson. 1947. Pp. 182. Fr. 480.

THOUGH much of the mathematical basis of modern statistical technique was French in origin, the application of the methods to biological material was largely the work of Englishmen. The value of the new approach to problems of therapeutic appraisal has now become fully apparent on both sides of the Channel, and Professor Morice's book no doubt results from a demand for a connected account of the development of statistical methods in medicine. The treatment of the subject is on conventional lines; a very full description of the various types of frequency distribution and their graphical representation and the several descriptive measures of central tendency and variability, followed by an outline of the usual tests of significance and measures of association. The mathematical formulæ used are given quite dogmatically, with little attempt at formal proofs, but the inherent logic of the method is made clear by appropriate arithmetical examples. The latter part of the book is taken up in a discussion of the practical details of the collection of the original data, timely warnings of the pitfalls and fallibilities of vital statistical data, and a useful account of the organisation and "processing," as the Americans have it, by punched-card methods, of large masses of accumulated material. A brief exposition by Professor Reboul of the more important mathematical principles used in statistical analysis concludes a book which, though hardly suitable as a primer for English-speaking students, allows those already initiated to extend their knowledge and appreciation of the resources of statistical technique, and at the same time to savour the lucidity and economy shared by algebra and French.

Physical Medicine in General Practice

Editor: ARTHUR L. WATKINS, M.D. Philadelphia and London: J. B. Lippincott. 1947. Pp. 341. 30*s*.

IN recent years medical science has made rapid progress in the prevention, diagnosis, and treatment of disease, but in the phase of reablement this progress has not been maintained. In this well-balanced book the leading American practitioners of physical medicine have placed their clinical experience at the service of the general practitioner. The chapters on reablement and employment, by Dr. George Deaver, and physiotherapy and reconditioning in American army hospitals, by Dr. Leonard Huddleston, especially, are full of interest. As Dr. Deaver points out, the basic needs of the disabled man are "the ability to care for his daily needs, to wash, to dress himself, to have the maximum use of his hands, and to have the ability to work and travel." The contributions have been written primarily for the practising doctor and surgeon, and emphasis has not been placed on the technical side of physical medicine.

A Manual of Otology, Rhinology and Laryngology (3rd ed. London: H. Kimpton. 1947. Pp. 352. 22*s*. 6*d*.).—Prof. H. C. Ballenger presents a clear and concise account of his subject to the undergraduate student: more advanced practitioners will find the new chapter on headache stimulating and informative.

Milk Products (2nd ed. London: H. K. Lewis. 1948. Pp. 343. 30*s*.).—This compendium of useful information, by Dr. William Clunie Harvey and Mr. Harry Hill, covers ice-cream, cream, butter and margarine, cheese, condensed, evaporated, and dried milk, and subsidiary milk products, and is a companion volume to their work *Milk: Production and Control*. The text has been brought up to date.

Pictorial Handbook of Fracture Treatment (2nd ed. Chicago: Year Book Publishers. London: H. K. Lewis. 1947. Pp. 390. 30*s*.).—This new edition of a manual nominally intended for general practitioners will in fact be of the greatest value as reference and refreshment for the practising fracture and orthopædic surgeon. The authors—Dr. Edward L. Compere, Dr. Sam W. Banks, and Dr. Clinton L. Compere—lay the usual American emphasis on pin fixation and open reconstruction, though not at the expense of simpler methods. The illustrations are really helpful, for they are the work of an artist who is also a surgeon.

Nicholas Pol, Doctor 1494 (New York: Herbert Reichner for the Cleveland Medical Library Association. 1947. Pp. 244. $7.50).—This beautiful text of Nicholas Pol's little-known tract on the guaiacum treatment of syphilis will appeal to lovers of rare works. Pol's own library of some thirty-odd books was first recognised for what it was some forty years ago in Ludwig Rosenthal's Antiquariat in Munich, and was bought, in 1929, for the Cleveland Medical Library at the instigation of Dr. Edward H. Cushing. With his uncle, Harvey Cushing, he set about collecting material for a monograph on Pol; but Harvey Cushing died in 1939, and Edward Cushing, whose search had been interrupted by the war, handed over his notes to Prof. M. Fisch. This book is the result. Besides the admirably translated tract—which reveals Pol's care and sincerity, even if the treatment he extolled was not all he thought it—it contains an outline life of Pol, and a catalogue of all books known to have belonged to his library, as well as a note on the German method of making beer, by another hand, which somehow got bound up with the tract after one of its copyings. Unfortunately the information given in this last item is rather scanty.

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THE LANCET

LONDON: SATURDAY, MARCH 27, 1948

Victory or Agreement?

OPPONENTS of the National Health Service Act fall into two main groups—those who want to see the entire scheme withdrawn, and those who might be content with modifications designed to protect professional freedom. The council of the British Medical Association, as a whole, belongs to the latter group, and at last week's representative meeting it obtained approval for a resolution "reaffirming the wholehearted desire of the medical profession for a comprehensive health service available to everyone," and indicating that the profession will be prepared to coöperate if the Government will make such changes in the Act "as are necessary to maintain the integrity of medicine and to prevent doctors being turned into State servants." The extent of the changes thought necessary was not specified; for the council firmly discouraged the meeting from recording its opinions categorically, and especially from discussing which (if any) of the points at issue might be conceded as part of a general settlement. Having no present intention of initiating fresh negotiations with the Government, it nevertheless left itself free to enter such negotiations if it thinks fit. At the same time, the representatives' votes on some of the resolutions have not made it any easier for the B.M.A. leaders to accept the sort of compromise which the Government might be willing to offer. Though the meeting approved in principle of a comprehensive service, it half-heartedly expressed approval of a gradual extension of National Health Insurance to dependants—thus reverting to what one may call the Old Look. Those elements that wish the Act to become a dead letter naturally resisted any effort to make it work, while most of those who seek amendment felt that most would be gained by obliging the Minister to take the first step. In departing to their constituencies, charged with raising funds for "the fight for freedom," the representatives left the prospect of amicable agreement rather less than when they assembled. Running true to form, they had chiefly decided what the B.M.A. should *not* do.

Meanwhile the Minister has given no sign that he seeks a rapprochement. The evidence suggests that, whatever his colleagues in the Cabinet may think of the plebiscite, they do not intend to intervene in his dispute with the profession; and, like the B.M.A. council, he can count on the loyal support of a majority. Each side, in fact, discounting the weaknesses of its position, appears to be prepared for a test of strength, which initially takes the form of a war of nerves. The danger attached to this opening phase of modern warfare is that it may insensibly pass into the next, and those of us who recognise the daily mounting damage done by the present conflict must hope that it will be cut short. If he really cares about the service, Mr. BEVAN will face the risk of a temporary loss of prestige and will make the first move, thereby justifying his friends' measure of his stature. It is nothing less than the duty of his position to reintroduce into this controversy an atmosphere of friendly understanding to which the profession could respond; and even if, in making a sincere effort, he were to fail, everyone would at least know precisely why and where agreement became impossible. Unfortunately the alternative course he is more likely to pursue is to present to Parliament, without previous discussion, a short amending Bill containing some such assurances and modifications as were suggested in the *Times* of March 15. In so doing he would have the satisfaction of a snub to the Negotiating Committee, and if his assurances and modifications enabled a few thousand practitioners to enter the service with a clear conscience he would have defeated the B.M.A.'s campaign. Even at this stage, however, we must again insist that victory—especially victory gained by economic pressure—is an unsound foundation on which to build a new service. Far too often in this controversy the desire for victory has taken precedence of the desire to do what is reasonable and right. It is high time that the Good stopped being so rude to the Clever, and the Clever so hard on the Good.

Recognising the dangers to medicine implicit in so large a scheme, and despite the doubts which every doctor must feel about it, we believe that the National Health Service is capable of raising standards both in medical care and in conditions of medical work. We welcome it as one of the greatest attempts ever made to realise the principle "to each according to his need." We hold that the deliberate nullification of an Act of Parliament by a section of the community, however well intentioned, would be a severe and most untimely blow to constitutional Government in this country. We recognise that successive Ministers have had consistent opposition from the representatives of organised medicine, and we deplore the factiousness of that opposition. But with all this we are appalled that, little more than three months before the appointed day, the Government, having needlessly provoked antagonism in almost every member of the profession, should be prepared to rely on financial sanctions to bring these doctors into the service. We do not doubt the possibility of their success; but we recall, as they apparently do not, the harm done for a generation and more by the similar success attained in 1911. Quite apart from the severe intraprofessional strains of that period, it may fairly be said that relations between doctors and the Health Department have never fully recovered, in 37 years, from the bad start given to National Health Insurance, and that many of the older practitioners, though they now recognise the value of N.H.I., have never quite lost their sense of grievance and underlying ill will. Today we are about to create a far more important service, engaging the efforts of almost every doctor. Unless this service enables each to give his best to his patient,

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and also to put his heart into the whole endeavour, the changes being made may prove worse than useless. Since the Government are making these changes, the Government and not the B.M.A. bear the primary responsibility for restoring and preserving good will. Much will have to be forgotten on both sides before that is possible, but the sooner a new relationship is established the less there will be to forget. Without this better relationship, the Government may win their victory; but the cost of that victory will be borne by the service for many years to come.

Attack on Rheumatism

DURING the last ten years the Medical Research Council has taken the view that extensive ad-hoc research on a disease like rheumatism, however great its practical importance, is likely to be unprofitable until the master key of its ætiology has been found. This view has undoubtedly influenced the attitude of many teaching hospitals to the chronic rheumatic diseases. HÖJER,[1] in his account of rheumatism research and treatment in Sweden, emphatically disagrees, because he thinks that one of the ways a research-worker is most likely to get inspiration is by constantly observing a disease, particularly its small and often overlooked but important clinical features. In Sweden, he says, it has been found essential to organise the care of rheumatic patients, and after a beginning with beds in special isolated hospitals, and later in county hospitals, finally special units for rheumatism have been established in the university teaching hospitals. In most of the London teaching hospitals the amount and quality of the instruction now given to undergraduate students on the medical diagnosis and treatment of rheumatoid arthritis, ankylosing spondylitis, osteo-arthritis, sciatica, and brachial neuralgia depends entirely on how much interest is taken in these subjects by the general physicians and surgeons with whom the students do their clerkships in outpatient departments and wards. In only two, or possibly three, of these hospitals are rheumatic patients deliberately collected for diagnosis, treatment, and research in special outpatient clinics or ward units where undergraduate teaching is done. In the remainder such patients usually gravitate in large numbers to the physiotherapy departments, where systematic instruction of medical students is hardly ever attempted and conditions are unfavourable for controlled investigation or follow-up. In several of the provincial medical teaching centres it has been decided to wait no longer for an ætiological lead and to tackle chronic rheumatism forthwith, primarily as a special treatment problem to be dealt with along lines that will offer as much scope as possible for all types of research. Thus at Manchester there has already been established a special department for rheumatic diseases which is to work in association with a new institute of bone pathology and with a clinic where rheumatism will be investigated as an occupational disease—e.g., in miners. Comparable developments suitably adapted to local circumstances are also taking place in Bristol, Leeds, and Liverpool.

It cannot be denied that in mainly undergraduate teaching hospitals the collection of patients suffering from one particular disease or group of diseases into special clinics and ward units has disadvantages. The creation of a new specialty which will sooner or later demand recognition in the overcrowded student curriculum is regarded by some teachers of medicine as highly undesirable. But the case for making the medical disorders of the locomotor system a subject for special study, which has been well put by FLETCHER,[2] appears to be at least as strong as for, say, the endocrine disorders. Some may also doubt whether the setting up of special rheumatism clinics and ward units, which given adequate finance is merely a matter of organisation, will provide the opportunities for research which HÖJER desires. The experience which some teaching hospitals have already had with other diseases, such as asthma, dealt with in this way may not have been encouraging. Too often special clinics established primarily for research rapidly became so swamped with patients hastily referred from general medical and surgical departments that they could attempt little more than routine treatment and fell accordingly into disrepute. Knowing that there is a special department for a particular disease, patients who believe themselves eligible clamour for its services and resent being excluded because they do not happen to fit into the category chosen for investigation. When the National Health Service begins, such difficulties will be multiplied, and there is much to be said against attaching an omnibus term like rheumatism to any special clinic or ward unit where it is hoped to carry out intensive research on particular diseases of the rheumatic group. Another objection often raised against the special ward unit for chronic arthritis is that the emotional atmosphere must inevitably be depressing and unfavourable to the patient. But the hospitals already possessing arrangements of this sort have found that the chronic arthritic is less likely to be depressed than encouraged by competition in progress and self-help with other patients similarly handicapped. In the general medical or surgical ward, on the other hand, these patients tend to become the neglected chronic cases whose apparent lack of progress is as disheartening to the medical and nursing staff as to themselves. For the medical staff, whole-time work in a special unit for disease of the locomotor system need not mean narrow specialism or a withdrawal from general medicine, and it is precisely on account of the broad medical scope of such work that it ought to be conducted in teaching and other general hospitals.

In this issue, Dr. TEGNER shows how necessary it is to be critical of current notions concerning the treatment and prognosis of rheumatoid arthritis; and few would dispute that the position regarding osteo-arthritis and ankylosing spondylitis is much the same. In a recent paper on brachial neuralgia BRAIN[3] wrote: "Much of the progress in medicine consists in differentiating the one into the many." For the lesser rheumatisms, such as fibrositis, this process has hardly begun. Swedish experience, and to a lesser extent that in our own country, points to the university teaching hospitals as the place where this should be done. The special outpatient clinic,

1. Höjer, J. A. *Ann. rheumat. Dis.* 1946, 5, 183.

2. Fletcher, E. T. D. Medical Disorders of the Locomotor System. Edinburgh, 1947; preface p. vii.

3. Brain, W. R. *Lancet*, March 13, p. 393.

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supported by an adequate number of inpatient beds for observation and diagnosis, preferably close at hand and collected together in a special ward unit, with other beds (which need not be nearby) for long-stay treatment, the whole comprising a regional or hospital area centre for the diagnosis and treatment of chronic rheumatism, was recommended by Lord HORDER [4] in 1942 and later by the special subcommittee on chronic rheumatism under the chairmanship of Prof. HENRY COHEN, which was set up by the Medical Advisory Committee to the Minister of Health [5] in 1944. Given modifications to suit local circumstances, there seems from experience to be no good reason why the establishment of such centres at teaching hospitals should not improve rather than hamper undergraduate medical education. It is difficult to see how the obligation of teaching hospitals to participate in the local hospital and specialist services which the new Act will attempt to provide can be properly discharged except in this way. If, as HÖJER says, from rheumatism as a clinical disease there are fine rootlets leading down to the origin of the evil, then the more hospitals try to find and follow them in a suitably critical mood the better for all concerned.

For and Against Myanesin

THE introduction of *d*-tubocurarine chloride into anæsthetic practice several years ago stimulated interest in the use of relaxant agents as adjuvants to anæsthetics proper. In therapeutics also their scope has been investigated, particularly in the treatment of spastic palsies of the limbs following spinal disease or trauma. This latter application is a crucial test of the specific paralysing effects of such drugs on voluntary muscle, because they must produce the desired action by themselves, without the support of any accompanying narcotic. In the case of curare the particular action of blocking the motor myoneural junctions in striated muscle has been accepted as physiological fact since the days of Claude Bernard. Little is yet known about any additional effects, good or otherwise, that it may have on other mechanisms activated through the medium of acetylcholine. Nevertheless, because of its significant and constant effect in relaxing muscles, curare in the form of *d*-tubocurarine chloride has become firmly established, and in the hands of expert anæsthetists it has proved to have several advantages to both patient and surgeon over other methods of producing muscular relaxation. Its disadvantages are largely avoidable, being related mainly to inefficient management of peripheral respiratory paralysis and failure to achieve a proper balance between the analgesic, narcotic, and relaxant components of the anæsthetic mixture.

Of the various chemical substances suggested as alternatives to curare, 'Myanesin,' or $\alpha:\beta$-dihydroxy-γ-(2-methylphenoxy)-propane, has undergone experimental [6] and clinical [7] trials. The results of these have provoked a considerable amount of argument. The advocates of this agent hold that it is as effective as curare and safer because it ensures adequate abdominal relaxation without affecting the respiratory muscles; but other observers contend that it is ineffective for producing muscular relaxation and that its use is often accompanied by undesirable effects [8] such as hæmolysis and thrombosis. The subject was discussed by the section of anæsthetics of the Royal Society of Medicine on March 5, when the case for myanesin was presented by Dr. F. B. MALLINSON, an anæsthetist who has employed the agent extensively, and by Dr. G. B. WEST, a pharmacologist They claimed that myanesin depresses reflex excitability of the spinal cord, is efficacious as a relaxant, potentiates barbiturates, and has a wide margin of safety. Hæmoglobinuria has been observed in 20 out of 10,000 patients who have received the agent, but Dr. MALLINSON and Dr. WEST pointed out that hæmolysis also occurs during barbiturate anæsthesia yet no strong objection to barbiturates has been raised on that ground. The hæmolysis and thrombosis which have been complained of by other observers could in their view be avoided by atraumatic intravenous technique, slow injection, and adequate dilution of the drug. Most speakers in the subsequent discussion took a serious view of the frequency and severity of the complications mentioned and maintained that the continued use of this agent in its present form could not be justified. It was suggested that hæmolysis is due to the drug itself, and thrombosis to the hypertonicity of the solvent. By very slow injection of the 10% solution which is supplied, or by additional dilution, the vascular effects might be prevented or rendered insignificant.

Perhaps the most important point elicited in this discussion was the relative ineffectiveness of myanesin in relaxing muscles. Evidence was submitted of its failure, when administered alone even in big quantities, to reduce the residual spasticity of limbs in cases of poliomyelitis, an observation already recorded in these columns [9]; and examples were given of surgical operations in which, despite apparently adequate doses of myanesin, the abdominal muscles went into tonic contraction when the peritoneum was handled. Dr. A. R. HUNTER, quoting the work of STEPHEN and CHANDY [10] and his own in collaboration with Dr. J. M. WATERFALL which appeared in our issue of March 6 (p. 366), suggested that the action of myanesin is not "curarisation" at all but is probably a depressant effect on the motor paths in the basal ganglia somewhat similar to that of the barbiturates. For a drug used primarily because of its reputed selective capacity of paralysing motor activity this was serious criticism. The great virtue of curare is that its action is almost wholly peripheral. Apparently myanesin has no comparable effect and there would be little value in employing it in anæsthesia merely to potentiate mildly the narcotic drug which must be given at the same time. It certainly cannot yet be said that the place of myanesin in anæsthetic or therapeutic practice has been firmly established.

4. Rheumatism: A Plan for National Action. Empire Rheumatism Council. 1942.
5. Report of the Chief Medical Officer on the State of the Public Health for the year 1945, p. 45.
6. Berger, F. M., Bradley, W. *Lancet*, 1947, i, 97; *Brit. J. Pharmacol.* 1946, 1, 265.
7. Mallinson, F. B. *Lancet*, 1947, i, 98. Lyall, A. *Glasg. med. J.* 1947, 28, 313. Wilson, H. B., Gordon, H. E. *Lancet*, March 6, p. 367. Davison, W. H. A. *Brit. med. J.* March 20, p. 544.
8. Pugh, J. I., Enderby, G. E. H. *Lancet*, 1947, ii, 387. Hewer, T. F., Woolmer, R. F. *Ibid*, p. 909.
9. Brooks, D. M., Handfield-Jones, E., Macfarlane, R. G., Seddon, H. J. *Ibid*, Feb. 21, p. 306.
10. Stephen, C. R., Chandy, J. *Canad. med. Ass. J.* 1947, 57, 463.

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The Doctor's Wife

IN its opposition to the National Health Service the British Medical Association is now to have the support of a League of Doctors' Wives, whose object is described as the protection of the doctor's wife and her home.[1] The unregistered half of our profession is thus being mobilised to resist the first and only serious attempt to improve her lot.

By common consent, the brunt of present makeshifts, shortages, and understaffing is borne by the housewife. Compared with many, the doctor's wife has economic advantages, usually including some domestic help; but she has large additional duties and a perpetual conflict of loyalties, since she is supposed to be equally loyal to the best interests of the patient and to the best interests of her family and household. Almost any emergency in the home or in the practice will make these interests clash, and she is forever battling with the opposed demands of her dual concern. It is easy for a popular doctor to be swallowed by his practice, unless it is made equally easy for him to find refuge from it in his home; and the tragedy of success in medicine is that it is almost incompatible with success in the personal life. As the link between the doctor and the man, his wife must know when he should be free to belong to his patients unreservedly, and when it is time to draw him back into the household so that he may remain an integral part of it. Unless leisure is accessible and attractive, a man who is immersed in his work will remain there for 24 hours out of 24: he finds it much less strenuous to deal with patients' unceasing demands when he is on duty and available than when he is striving to be at leisure, and any striving must therefore be done on his behalf by someone else—usually his wife. If in discharging all these complex tasks she can hope to enjoy some companionship from the doctor, she pays for this by putting herself in the wrong with the population of the district in which he works. To them she plays the rôle of dragon, and her social situation is even worse if she also relieves her husband of the collection of fees. Those doctors who regard financial demands as harmful to the doctor-patient relationship, which gives their work its chief satisfaction, often assign to their wives the unwelcome duty of sending out the accounts.

Compared with other women, the doctor's wife makes greater sacrifices to her husband's work: indeed she joins in it. But why should she suppose that her motives for shouldering heavy tasks are going to be destroyed by the National Health Service Act? Hitherto she has been inspired presumably by affection for her husband and the desire to make his practice a success, and we cannot see why these motives will weaken when her husband works under contract with an executive council and when success is no longer counted in fees for each service rendered. What is evidently feared is that as soon as every patient becomes entitled to medical care without payment of a fee, the number of attendances at the surgery, and the strain on the doctor's wife, will be vastly increased; and we do not deny that some increase is probable. The fact remains that in the mixed practice of today the principal parasite is not the insured person, who can have the doctor's help for the asking, but the private patient who (because he pays) feels entitled to attention at a time most convenient to himself and regardless of his real need; indeed, the panel patient who knows that the attention he will get is neither more nor less than he requires shows himself in general considerate and careful in his demands. If there is risk of larger crowds in the waiting-room during the next few years, there is at least the certainty of relief from the tedious, time-consuming, and distasteful labour of collecting fees, and from the necessity to forge a living out of other peoples' misfortunes. If there are as yet none of the health centres which some day will enable the doctor's wife to call her home her own, that is not the fault of the Act, or even of the Minister, but simply the result of a national impoverishment which we must all work to overcome. Now that legislation and official policy are at last on the side of the doctor's wife, it seems a pity that she should be responding with an outcry which may well be human but is hardly fair.

1. *Brit. med. J.* Feb. 28, p. 410.

Annotations

MORE HOME-GROWN FOOD

LAST spring and summer we published three articles from a correspondent recommending a much more active policy of food-production in this country. Exports, it was urged, could not be expected to maintain a level much higher than that reached in pre-war years, and the country would be forced back to growing more food at home. Restriction of food-production was attributed to the policies of economists, who count on a low world price for food, whereas agricultural experts are confident that, given the necessary priorities, a great proportional increase is practicable.

In August the Government announced a new policy for agriculture, raising the target to £100 million and introducing higher wages and prices. This was, for a British Government, a radical change of policy, and it was condemned by the *Economist* on the ground that sooner or later world food prices would fall and that in the long run it would be uneconomical to produce food at home at higher prices than those at which it can be bought from abroad. Unfortunately this argument ignores the fact that a point may come at which, having no foreign exchange, we are no longer able to buy abroad at any price. The risk of this happening has become increasingly obvious, and the recent *Economic Survey for 1948* goes far to justify the line our correspondent took a year ago. Meanwhile only one-eighteenth of our labour force is employed in the production of food, and many good corners of agricultural land remain uncultivated. World food prices, instead of falling, have risen, and, barring a slight reaction in wheat and maize prices in America, this country is faced with a new high level—witness the agreements recently made with Denmark and the Argentine. It would be possible for the Government to go much further towards making us self-supporting if, as our correspondent suggested, they decided to use the economic incentive of high prices to the farmer.

Such decisions still rest largely in the hands of the economists, but the subject has many different facets, and the facts must be of special concern to those interested in nutrition. We need to know, for example, whether it is true (as many agriculturists have asserted in Parliament and elsewhere) that given the labour, the cottages, and the economic incentives, a really great increase—not by £100 million but by three or four times

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that amount—is practical politics. If it is, can the economists show any solid reason why the farmer should still be hampered by price control of his produce, as (despite the subsidies) he is hampered today? Or why the prices guaranteed by the Government to the farmers should not be allowed to rise until they correspond with the prices we are having to pay for imported food? The farmers have in these matters too few allies, for the business community has been reared in the school of thought which links cheap food with business prosperity, and officialdom has inherited from the days of laisser-faire a fear that higher prices to the farmer must mean dearer food and higher wages to the industrial worker.

The *Times* speaks guardedly of increase in home-grown food as a "costly" policy. But the word "costly" has little meaning, even in its strict monetary sense, and if social welfare and the true costliness of ill health are brought into the picture it has less still. Medical men are in a good position to see the expensive and unattractive side of an artificially intensified industrialism of England which is still the dominant policy of the Government. And clearly there may be serious objections to arrangements which interfere with the price mechanism to the farmer's detriment and yet fail to give him the priorities he still lacks in man-power, housing, and economic incentives.

PREVENTION OF RADIATION HÆMORRHAGE

EXPOSURE to big, but sublethal, doses of X-ray or other radiation can cause severe hæmorrhage, in the form of oozing from mucous membranes, which is often fatal. Allen and Jacobson [1] produced evidence that there was an excess of heparin in the blood in this condition, and that the hæmorrhage could be inhibited with toluidine blue. However it now appears that the dogs so treated all eventually succumbed to the hæmorrhagic tendency, though they did survive twice as long as the untreated animals. Rekers and Field,[2] who quote this experience with toluidine blue, do not deny that the coagulability of the blood is reduced after exposure to radiation, but they maintain that the blood-vessels themselves are affected and that the intractable capillary oozing is due to actual capillary weakening or even destruction.

The flavonol compound, rutin,[3] has been used to correct excessive capillary fragility in some primary hæmorrhagic disorders. Rekers and Field therefore gave a group of dogs 150 mg. of rutin daily by mouth for a week before exposing them to radiation, and continued the dose throughout the following test period. Of 25 dogs so treated, 3 died from widespread subcutaneous and intestinal hæmorrhages within thirty-one days of exposure; of 25 untreated animals, 16 died within the same period. The two groups showed essentially similar blood changes—a leucopenia and a well-marked thrombocytopenia maximal between the 15th and 20th days—but in spite of the fall in their platelet-counts the rutin-treated group had no bleeding. This finding supports the view that radiation hæmorrhage is the result of direct action on the blood-vessels rather than alterations in the blood itself.

The dose of rutin used in these experiments is large—150 mg. daily, compared with the maximum of 120 mg. daily given by Shanno [3] to human patients with hypertension and increased capillary fragility. On the whole, experience with rutin in human non-thrombocytopenic hæmorrhagic disease has been disappointing. Perhaps too small a dose has been used; but the experimental results obtained by Rekers and Field also suggest that rutin is less effective once hæmorrhages have developed.

1. Allen, J. A., Jacobson, L. O. *Science*, 1947, **105**, 388; see annotation, *Lancet*, 1947, **i**, 718.
2. Rekers, P. E., Field, J. B. *Science*, 1948, **107**, 16.
3. Shanno, R. L. *Amer. J. med. Sci.* 1946, **211**, 539; see annotation, *Lancet*, 1946, **ii**, 16.

FAVISM: TOXIC OR ALLERGIC?

A DISEASE long known in the Mediterranean basin and more recently in America, favism (or fabism), is acquired either by inhaling the pollen of the flower of the broad bean (*Vicia fava*) or by eating the beans. The pollen factor immediately suggests that favism is an allergic phenomenon, a supposition which is supported by the fact that only a small proportion of persons who work among the flowering plants or eat the beans are affected. Favism can appear at any age but principally affects small children, males more often than females. It is obviously of seasonal incidence, like hay-fever; but, unlike hay-fever, it sometimes has an incubation period lasting from a few hours to a couple of days. In other cases the onset is very rapid, for the victim may suddenly collapse while crossing a beanfield. It usually manifests itself by general malaise, weakness, headache, vertigo, intense pallor of the skin, and bloody urine. There may also be moderate pyrexia, thirst, anorexia, nausea and vomiting, flatulence, and either constipation or diarrhœa; children usually have diarrhœa. Sometimes liver and spleen are enlarged and tender; but jaundice, if present, is usually slight. Nervous reactions, such as coma, delirium, and changed personality, have been observed. Fatal cases die from an excessive destruction of red cells, sometimes complicated by hæmorrhages, producing purpura and melæna. The urine may contain hæmoglobin, urobilin, slight amounts of albumin, and sometimes sugar, with a deposit of hyaline and granular casts and occasional red cells. The quantity of urine is usually diminished; in severe cases there may be none. Stools are fetid and yellow. Blood examination shows anæmia, perhaps as few as 1,000,000 red cells per c.mm., and various abnormal cells indicating medullary proliferation, with a white-cell count raised to 12,000–15,000 per c.mm.

A peculiarity of favism is that it is not coextensive with the culture of the beans but is restricted to certain localities, of which Sardinia seems to be the most affected. It used to be thought that there was a toxic substance present in both flower and fruit of the broad bean, but there is no relation between severity of symptoms and quantity of beans eaten. Experimentally, hæmoglobinuria has been produced in rabbits by sensitising them with extracts of the beans. Whitby and Britton [1] regard favism as a form of allergic hæmolytic anæmia and compare it with Bagdad spring fever caused by acquired sensitivity to various pollens, especially that of *Verbena hybrida*. A puzzling case from Italy is reported by Tondi.[2] A man, aged 47, who had often eaten beans, raw or cooked, throughout his life without any ill effects picked and immediately ate three or four beans in a field one afternoon. The same evening he complained of headache and lumbar pain, and felt feverish. Two days later he vomited and became extremely prostrate, with clouding of consciousness and bloody urine. An interesting point is that he was allergic to quinine, a sister of his was allergic to aspirin, and a brother had died of favism at the age of 9 years.

Little has been known of the pathology hitherto. Only five necropsies had been reported [3] until recently; but Lioia [4] now describes the cases of three brothers, aged 2, 4, and 8 years, of whom one died. The eldest had had a previous attack of favism when he was 3 years old. After this episode he had kept away from beans for five years. Two days before the present attack he had gone to pick beans in a field but had to return

1. Whitby, L. E. H., Britton, C. J. C. Disorders of the Blood. London, 1946; p. 280.
2. Tondi, I. V. *Policlinico*, 1947, **54**, 889.
3. Gasbarrini, A. *Ibid*, 1915, **22**, 1505, 1537. Lunghetti, B. *Riv. Biol.* 1927, **9**, 273. Guccione, F. *Policlinico*, 1930, **37**, 32. Bentivoglio, G. C. *Clin. Pediat.* 1933, **15**, 335. Veras, S. *Arch. balkan. Méd. Chir.* 1940, **2**, 52.
4. Lioia, N. *Policlinico*, 1947, **54**, 617.

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to his home because of malaise, pallor, and weakness. Nevertheless he and his brothers partook of a few fresh beans two days later, unknown to their mother, and soon afterwards he collapsed. His two brothers spent a normal day and did not collapse until noon and three o'clock on the morrow. The youngest brother died in coma in a few hours, before a blood-transfusion could be given. At necropsy all organs were extremely anæmic except the enlarged spleen. The principal lesions were found in the spleen, liver, and kidneys. The splenic lesions resembled those seen in other forms of acute hæmolytic anæmia. The organ was enlarged and hard, and the tissue packed with erythrocytes. There was extensive necrosis and fatty degeneration of the liver parenchymal cells, chiefly centrolobular in distribution. The parenchymal cells at the periphery of the lobules were much less affected. About three-quarters of the liver epithelial tissue was degenerate or necrotic and in the areas of maximum change the hepatic capillaries were dilated and full of blood. In the less damaged areas the capillaries were often nearly bloodless. The changes in the liver cells were primarily degenerative and not inflammatory. In the kidneys the cortical zone was profoundly altered, the epithelium of the convoluted and intercalary tubules being degenerative and often necrotic; the lumina were filled with granular albuminous material, said to be coloured red with hæmoglobin. The epithelium of the straight tubules and ascending loops of Henle showed scattered degenerative and granular changes. The glomeruli showed no specific changes except occasional fatty degeneration. Lioia draws attention to the close clinical and pathological similarity between the changes seen in the kidneys in favism and those reported in other hæmoglobinuric states, particularly malaria. The renal syndrome thus appears to be non-specific and closely allied to the picture of "renal anoxia."[5] The changes in the liver are apparently also non-specific and remarkably similar to those seen in many other conditions, including malaria and shock, often in association with "renal anoxia."[6]

ALUMINIUM REVINDICATED

FOR no very certain reason aluminium comes under a domestic cloud from time to time. Is it safe, the housewife asks, to use my aluminium saucepan? An emphatic Yes is the answer of Mr. J. M. Bryan, PH.D., in his carefully documented report for the Department of Scientific and Industrial Research.[7] Early troubles with aluminium, he says, largely arose from the metal used being of inferior quality and too light a gauge, and from carelessness in the choice of materials for cleaning. To avoid corrosion, cleaning materials should be restricted to soap and water, or steel wool, or some moderately abrasive household cleaner; copper wool must not be used since this contaminates the surface with copper and promotes galvanic attack, and washing soda should be prohibited unless mixed with sodium silicate. Normally, corrosion is inhibited by the thin film of oxide which forms spontaneously when aluminium is exposed to the air; and a coarse abrasive, by roughening the surface, not only makes the metal more difficult to clean but also breaks down this film. Again to avert corrosion, utensils should be dried when not in use. The objectionable black stain which sometimes appears on aluminium pots and pans may be due to an optical effect from slight etching of the metal, or to an impurity, such as iron or silicon, actually left on the surface as a result of corrosion; in any event, the film is harmless and can be dispelled by boiling in water acidulated with vinegar or acetic acid. The darkening of tea made with water boiled in an aluminium kettle is sometimes attributed to a colloidal change in the tannin; but since the effect is especially pronounced with water taken from new kettles, it may be caused by particles of iron left on the surface of the aluminium by tools used in shaping the kettle.

Acids tend to corrode aluminium, and hot fruit juices may attack it severely. There is some evidence that sugar inhibits this action, and the successful use of aluminium pans in jam-making is probably due mainly to this protective effect and the high viscosity of the mixture. Severe corrosion may, however, be caused by transferring fruit, during cooking, from a pan of iron or other heavy metal.

Aluminium seems to be singularly innocent of injurious action on food entrusted to it: it does not accelerate destruction of vitamins even at boiling-point, it has no effect on fermentation by yeast, and it does not promote rancidity of oils or fats. In the eyes of the cook it has other and more positive virtues: it is light, it has a high heat conductivity, and, even in untender hands, it does not corrode easily. Finally, the renewed assurance that any traces of metal picked up by food in the cooking do not impair the consumer's health should go far to remove any doubts among the public.

5. Maegraith, B. G., Havard, R. E., Parsons, D. S. *Lancet*, 1945, ii, 293.
6. Maegraith, B. G., Andrews, W. H. H., Gall, D. *Ibid*, 1947, ii, 781.
7. Aluminium and Aluminium Alloys in the Food Industry: Department of Scientific and Industrial Research, Food Investigation. Spec. Rep. no. 50. H.M. Stationery Office. 1948. Pp. 153. 3s.

OUR NUTRITIONAL STATUS

THE all-day conference of the Nutrition Society, reported on another page, might have been expected to answer the question, "How has our nutrition fared since 1939?" In the event the discussion was disappointing in that it told us little about nutritional trends, but illuminating in that it revealed why our knowledge is so scanty and showed the way for future work.

Professor Yudkin recalled how six years ago the suggestion was put forward[1] that a Nutrition Council should be formed, one of whose functions would have been to keep a continual check on the nutritional state of the people. It was said at the time that this was not necessary—that the Ministry of Health already had the organisation to carry out these functions. But this meeting suggested that we are lamentably ignorant of what has been going on in regard to the people's nutrition. "What a pity," said one speaker, "that there are not available such data on nutritional states as the Ministry of Food has for food consumption over the past seven years!" The surveys conducted by the Ministry of Health began in 1942, when Professor Sydenstricker, visiting this country from the U.S.A., was asked to give his opinion on our nutrition. In the short time at his disposal he used a rapid method of examination which suggested that there was nothing much amiss. But that is not the same as determining, in detail and periodically, the changes which might have occurred before and after that time. Surely what was wanted was a thorough-going investigation, using all the possible methods of nutritional assessment, to establish base-line data on a representative sample of the population, and then a periodical review, as has been done in the Ministry of Food's quarterly determinations of food consumption. In fact the Ministry of Health repeated the examinations as nearly as possible in the manner used by Sydenstricker. The Ministry's first team—two observers—was trained by Sydenstricker himself. Since then, the "torch has been carried," as Dr. Magee put it, from team to team, the two or three members of the team being changed periodically. Even if we assume that in this difficult task of assessing nutritional state one observer can train another so that their judgments will agree fairly well—

1. Leading article, *Lancet*, 1942, ii, 399.

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and experience is against this—surely by now, in the third or fourth relay, the torch will be held quite differently and will throw different shadows. We have in fact been told that "the procedure has been slightly modified in the light of experience." It is difficult to believe that the present criteria of malnourishment are just the same as those that Professor Sydenstricker followed in 1942. Moreover, the only clinical signs which are now classified are folliculosis, gingivitis, and corneal vascularisation, none of which can be accepted as true criteria of nutritional deficiency. As for nutritional trends, the Ministry's observers never examined anything approaching a cross-section of the population. To quote from two of their reports: "It is important to point out that the type of child examined was somewhat different" (1946); and "It should be remembered that the earlier surveys were carried out by selection in what had formerly been depressed areas" (1947). One cannot justifiably set one collection of figures against another, except in one or two recent instances where small groups have apparently been examined twice.

In 1942, when the food position seemed precarious, a "snap" survey was probably necessary. But since then it would have been advantageous to organise several larger teams of expert nutritionists, who could have applied all the known methods of nutritional assessment regularly and throughout the population. By now there would then have been sufficient information to enable us to evaluate the usefulness of the different methods, and we should have had a good idea of the nutritional trend through the last few years. Professor Marrack ended his paper with the remark: "It is essential to establish base-line data in 1948 if we wish to know in 1951 what has been happening to the nutrition of the people," and Professor Yudkin pointed out that this was exactly what the advocates of a Nutrition Council asked for in 1942. It is too late now to find out what changes have occurred, but it is not too late to devise machinery for detecting future changes.

CRAMP IN PREGNANCY

ONE of the most distressing symptoms which the pregnant woman has to endure is cramp. The attacks usually being in the 28th week, occurring at night and sometimes several times during the night. A common site is one of the muscle groups of the legs, but the hips and thigh and feet, and occasionally the arms and hands, may also be affected. The cramp tends to recur in the same place, each attack being short and sharp. Moving after a period of rest brings on the pain; the patients complain that it starts when they wake up at night and change their position in bed. There is no resemblance to tetany, since the pregnancy cramps are asymmetrical in distribution, do not produce characteristic postures, and are unaccompanied by signs of neuromuscular irritability.

Robinson [1] has investigated 198 cases of pregnancy cramp, of which 93 were treated with sodium chloride, at first given as gr. 60 of powder twice daily but later as pills containing gr. 15 t.d.s. after meals with water; 48 with calcium lactate tablets gr. 10 t.d.s.; 25 with saccharine tablets; and 32 with nothing. The sodium chloride quickly stopped the attacks in over 80% of cases, whereas the calcium lactate and saccharine were both successful in about 40%. In almost all the women there was no more cramp after the onset of labour. The recurrence-rate in the cases successfully treated was roughly 10% and it was clear that the recurrences followed salt loss; in 2 patients the cramp returned after a period of diarrhœa and vomiting, and the other recurrences all occurred in hot weather when sweating would be active. The danger of giving salt to the pregnant woman is negligible, provided there is no sign of toxæmia; nor is the infant or the course of labour affected. Robinson concludes that the cramps of pregnancy are similar to the heat cramps in industry due to salt deficiency. She suggests that there may be an adrenal insufficiency in pregnancy, or that the greater activity of the ovary necessitates an increased salt intake.

1. Robinson, M. *J. Obstet. Gynæc.* 1947, 54, 826.

WESTMORELAND LODGE

FOR some time past the Royal Medical Benevolent Fund [1] have been preparing this house, near Wimbledon Common, to receive a number of old ladies who are their beneficiaries. In a progress report Mr. R. M. Handfield-Jones, chairman of the committee of management, tells us that 12 residents have now been comfortably installed, each with her own bed-sitting-room equipped with either gas or electric fires and apparatus for minor cooking. A large room on the ground floor, with a sun lounge overlooking the garden, serves as communal dining and sitting room. The success of Westmoreland Lodge leads the committee to ask whether there should not be a similar house for men, and also accommodation for the sick and bedridden. The answers to these questions, Mr. Handfield-Jones points out, must to some extent depend on the reaction of doctors to the fund's ideas. The committee would therefore like to know how far the profession approves of the work being done in its name.

1. Balliol House, Manor Fields, London, S.W.15.

PANCREATIC FAILURE AND PROTEIN LACK

THE conception put forward by Dr. Davies in his paper of Feb. 28 (p. 317)—that the kwashiorkor or malignant malnutrition common in Uganda is primarily a pancreatic disorder—is carried a step further by Professor Véghelyi, of Budapest, in his letter in this issue. After the siege of Budapest in 1944–45 he was able to observe from the earliest stages the development of what seems to be a similar syndrome in people living on a diet containing no milk or other complete proteins. He noted that the first effect of the dietetic deficiency was a failure in the exocrine secretions of the pancreas; this stage was followed by diarrhœa and liver enlargement, and then after a few weeks by progressive anæmia and fall in plasma proteins; finally the patients developed the full picture of nutritional œdema. Necropsies showed the same findings in the pancreas and liver as Davies noted in Uganda. The condition did not respond to vitamin supplements but could be checked in a few days by giving sufficient amounts of milk.

Dietary deficiency sufficient to lead directly to this condition is unlikely to occur in the normal circumstances of western civilisation; but in the history of our knowledge of deficiency diseases there are many instances in which recognition of the dietary factors directly responsible for a deficiency syndrome in malnourished races has led to the realisation that similar deficiencies arise in temperate climates as the indirect result of disease. It seems at least possible that a protein-deficiency syndrome, similar in part to that described in the tropics as kwashiorkor or malignant malnutrition, may occur in this country as a complication of severe intestinal disorders in children, and also perhaps as a result of impairment of metabolic function.

F.R.S.

IN the list of fellows of the Royal Society elected on March 18 we note with much pleasure the name of Sir Leonard Parsons, emeritus professor of diseases of children at Birmingham, and of R. A. McCance, professor of experimental medicine at Cambridge. Non-medical fellows include A. L. Hodgkin, W. A. H. Rushton, and Dorothy Needham, of the Cambridge schools of physiology and biochemistry.

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Special Articles

AFTER THE PLEBISCITE

B.M.A. REPRESENTATIVE MEETING

A SPECIAL representative meeting of the British Medical Association was held in London on March 17, with Dr. J. B. MILLER in the chair, to consider the result of the plebiscite and the council's recommendations.

Lord HORDER (Marylebone) put this resolution:

> That in view of the continued misleading statements made by the Minister of Health and supported by some sections of the press, this meeting wishes to place on record its opinion that the British Medical Association is thoroughly representative of the medical profession and that the council and the B.M.A. representatives on the Negotiating Committee could not be elected more fairly or freely.

Doubt, said Lord Horder, had been thrown on whether the association was constitutionally a democratic body representative of the profession; and in the public interest it was necessary to nail this lie to the mast. The association now had the profession's confidence in fuller measure than ever before, for the profession realised that the association's policy had crystallised; the principles for which it stood were not bargaining points but were dictated by insistence that the doctor should be a free man. "I am a B.M.A. man because I realise that if we stick together we shall win." It would, however, be possible to lose by squabbling over which of the principles were the most important or which should be yielded to the Minister first or last. That way madness lay; there should be no yielding on any points essential to freedom, and once this determination was made clear, covering legislation against the nationalisation of medicine would follow.

Dr. J. A. PRIDHAM (council) pointed out that the association now has a membership of 58,195, which is 75% of the profession in the United Kingdom. The Marylebone motion was carried.

THE PLEBISCITE

Dr. GUY DAIN (chairman of council) said that it must be apparent that there was something seriously amiss with an Act which provoked such a strong demonstration as that afforded by the plebiscite results. The Minister of Health at his last meeting with the Negotiating Committee had endeavoured to split the profession by offering special favours to consultants and specialists. This effort had failed, and these groups were the most strongly opposed to the Act. The plebiscite had shown that the whole profession, including research-workers and those engaged in Government services, were seriously perturbed. All saw that in the proposed service their essential freedoms would be endangered.

Dr. S. NOY SCOTT (Plymouth) won support for a resolution endorsing the view that the profession should stand by the position as revealed in the plebiscite results. Time, said Dr. Noy Scott, was getting short; and he asked that the council should advise at once that service should be withheld.

Dr. DAIN, on behalf of the council, asked the meeting to adopt this recommendation:

> That the representative body, reaffirming the whole-hearted desire of the medical profession for a comprehensive health service available to everyone, urges that in the public interest such changes should be made in the National Health Service Acts of 1946 and 1947 as are necessary to maintain the integrity of medicine and to prevent doctors being turned into State servants with harmful consequences to patient and doctor alike. The representative body therefore expresses the hope that the Government will make it possible for the profession to coöperate by making such changes, and states its view that it is not in the best interests of the public or of medicine for members of the profession to enter the service until such changes are made,

Before the plebiscite, said Dr. Dain, the association had done its best to explain the position justly to the profession; but this had not protected it from charges that the plebiscite was not fair and that there was intimidation to keep doctors out of the service. The association was next accused of sabotaging an Act of Parliament; but the Act gave doctors authority to decide for themselves whether or not to take part. Then followed charges that the plebiscite was not secret and that the votes would not be correctly counted; and in the middle of the plebiscite there had been the unique event of Parliament discussing an Act on a resolution from the Minister in charge of it. Why had this debate been held? It had been an attempt by the Minister to intimidate doctors in voting. The association had been further accused of being politically inspired. These were the manœuvres improperly used to influence the profession in their decision. The Minister had, however, failed to divide the profession.

It was unfortunate that the problem was being approached in a spirit of emotion and party politics. If unnecessary political ideologies were excluded, the association could coolly devise an efficient service. The chief objection to the proposed new service was the wide powers given to the Minister; the exercise of these powers would lead to enslavement of the profession and control of it by the Minister or, in effect, his officers. It would be up to these officers to make the controls so good that they would keep out of trouble with the Minister or through questions in Parliament. The fear was that doctors would become servants of the Ministry of Health: "we are engaged in a life-and-death struggle for freedom and independence," and these would be lost if the Act were not amended; for the progress of medicine in this and many other countries amendment was essential. Doctors could not be accused of being influenced by monetary considerations, for so far there had been no opportunity to discuss remuneration.

"This Act," Dr. Dain continued, "is a paper service and nothing else." The people, who had been promised a complete service, were going to be gravely disappointed; no complete service could be offered on July 5 or on any approximate date, and if they had been wise, the Government would have introduced the service in stages. Dr. Dain hoped that doctors would not lend themselves to this disappointment, the responsibility for which was entirely the Government's. The reason why the Government so insistently clung to July 5 as the date for starting the service was that from this day they would need certifying doctors firmly in their grasp for the new National Insurance scheme. Dr. Dain concluded:

> "We are accused of intransigence. Yet our position today is that we are willing to explore the problems afresh provided that the outcome is a service in which the medical profession remains an independent profession secure from domination by the State. Can I say more?
>
> "We doctors want a health service. We want our services to be available to all who need them. We are ready to enter into any discussions directed to making it possible for the medical profession to coöperate with the Government. If the Government can show us other ways—new ways—of preserving our independence, we are willing to listen. But if this cannot be done, we owe it to the public to make our stand.
>
> "We ourselves approach the prospect of a fight in anything but a light-hearted mood. Whatever may be said on the other side—and it has been often rumoured that some political circles are not unwilling, as they put it, to 'smash the doctors' as the first step to reducing all independent workers to subservience—we ourselves can have no place for any such irresponsible levity. We know there is too much at stake in this fight—for ourselves, for medicine, and for the public as a whole. But prepared

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as we are for discussions aimed at conserving our essential freedom, willing as we are to examine new proposals, I should be failing in my duty to the profession and to the public if I did not make absolutely clear that in the absence of such necessary changes we shall stand as a united profession outside this service, continuing with our daily work but unwilling to enter a service which in its present form is inconsistent with the freedom of medicine and of the public."

The council's motion was carried unanimously.

FUTURE SETTLEMENT

Mr. J. W. TUDOR THOMAS (Cardiff) moved that the ownership of goodwill by the practitioner, abolition of basic salary and of powers of direction, and the right of appeal to the courts be regarded as essentials in any settlement with the Minister. These points, which were, he said, essential to freedom, should be considered collectively rather than individually; but the list was not exclusive. Dr. E. W. GOODWIN (Leicester and Rutland) agreed that there could be no compromise on principles: "We must either stand firm or abandon them altogether."

Dr. DAIN suggested that the meeting was not spending its time profitably in repeating resolutions already passed at previous meetings. As to these principles, "if we begin to consider them separately we may have to decide which we are willing to give away." It was not for the association to list concessions but to establish freedom. Dr. C. K. CULLEN (City) proposed a motion that the council should seek to have abolished the Minister's power to establish a whole-time salaried service; in the words of the motion, the buying and selling of practices, negative direction, and appeal to the courts were not essential factors in ending the deadlock. Dr. DAIN retorted that the association would adhere to its declared principles; and the City resolution was rejected.

Dr. R. W. COCKSHUT (Hendon) said it was wrong to put the buying and selling of practices alone on a pinnacle: "it is the powers of the Minister we have to get at"; and it was necessary to deal with causes, not symptoms. What the association sought was a service in which doctors could be free. It would be wrong to pass a firm resolution, for this would precipitate a conflict and it would be playing into the Minister's hand. "We do not want a conflict; we stand for a service on July 5 if it can possibly be obtained." But if a conflict were forced on the profession its demands, now moderate, might grow.

Dr. DAIN again intervened to say that any proposals received would be measured by their effect on independence. "Let it stand till we have proposals before us." The meeting decided to take no vote on Mr. TUDOR THOMAS's motion.

Dr. J. C. ARTHUR (Gateshead) asked the representatives to reaffirm their view that no penalty should be imposed on either doctor or patient who remained outside the National Health Service. This was supported by Mr. C. E. BEARE (Reigate), who said that unless it were possible for doctors to stay out of the service a monopoly would be set up. The motion was carried.

The meeting also supported a South-west Essex motion that in the event of negotiations being resumed and/or after amendment of the Act to the satisfaction of the Negotiating Committee and the representative body, neither consultants nor general practitioners should agree to terms till both sections of the profession were satisfied.

Dr. G. W. IRELAND (Lothians) asked the meeting to resolve:

(1) That representatives were willing to reopen negotiations with the Government: and (2) that if negotiations were reopened representatives should be empowered to make concessions provided that an amending Act were passed to ensure that a whole-time salaried service would not be introduced.

Dr. Ireland said that without the intervention of a third party—which seemed unlikely—one side or the other must take the first step. The side with the biggest ideas would make the first move; and it was in keeping with the profession's traditions that the move should come from it. Such a move would indicate not weakness but statesmanship; this did not mean surrender. If then the Government remained adamant public opinion would swing round in favour of the doctors; and there was no gainsaying that public opinion would exert a most important effect. If the conference decided to fight to a finish and the association were then defeated, all the principles would have been lost.

Dr. A. C. DE B. HELME (Guildford) called this briefly a "frightful exhibition of appeasement"; but Dr. D. S. ROBERTSON (Edinburgh) undertook to support the first section of the motion. The approach should, he said, be from the other side; but a clear expression of willingness to participate in negotiations should go out from the meeting. "We must get away from the cloud of recrimination and bad feeling" which had obscured the issue; it was possible to coöperate without retreating; and willingness to do so would profoundly influence the attitude of lay people, many of whom were ignorant of, or hostile to, the profession in its stand. The Lothians motion was, however, lost by a large majority.

The representatives also rejected this motion:

That the representative body is of opinion that the integrity of medicine, the freedom of the doctor, and the welfare of the patient can be maintained if the National Health Acts of 1946 and 1947 are amended so that the universal basic salary of £300 per annum can only be altered by Act of Parliament, and not by regulation.

The meeting turned down a further motion urging it to agree that it considered "that the primary issue between the association and the Minister of Health is the possible conversion of members of the medical profession into full-time salaried servants of the State, and regards it as essential, therefore, that this possibility should be eliminated by an amending Act." Dr. H. S. HOWIE WOOD (Isle of Wight) did, however, win support for a resolution that the profession should be advised against participating in the new service unless guaranteed that no material changes in the terms of service would be made without prior agreement with the profession.

POLITICAL PRESSURE

Dr. J. A. BROWN (council) read three letters received by doctors in various parts of England and Wales. One came from a trade-union, another from a trades council, and the third from the local branch of the Socialist party. Each expressed concern for the well-being of members and their families after the appointed day and inquired whether the doctor intended to enter the service; in one it was indicated that otherwise steps to protect the interests of members would have to be considered. So far, Dr. Brown recalled, no official invitation to join the service had been issued. It looked as if organised political and trade-union pressure were being brought to bear on doctors: "it is a mixture of impertinence and political blackmail," and a scandalous attempt to intimidate doctors in individual areas. No doctor should be expected to indicate his intentions before the promised six months' interval had elapsed. The meeting agreed almost unanimously to a resolution describing as grossly improper "pressure for political purposes upon individual doctors to induce them to inform outside bodies of their intentions in relation to the new service."

NEGOTIATION

A West Middlesex motion asked that the council be instructed to take no steps to reopen negotiations before July 5. Dr. DAIN said that this motion, if passed, would not strengthen the association's position: "I agree that we should not take any more steps; but we have

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taken an important step this morning in saying that we are open to negotiation." The representatives decided to pass to the next business.

APPROACH TO PRIME MINISTER

For Birmingham, Dr. F. E. GOULD suggested that the Negotiating Committee should approach the Prime Minister forthwith with a view to reopening negotiations. Dr. HOWIE WOOD thought that the events of the past few months had shown that Mr. Bevan was not the man with whom the profession could conduct successful negotiations. Dr. DAIN asked the meeting to turn down the proposal. "It is not for us to go either to the Minister of Health or the Prime Minister." Deaf to Dr. GOULD's appeal that they should "not turn down this resolution too badly," representatives voted against it by a large majority.

POSTPONEMENT

A Guildford resolution called for the postponement of the comprehensive service until the necessary hospitals and other resources, including personnel, were obtained. The service, it was held, was a deception on the public; and the profession should not lend itself to this deception. The speaker, Dr. L. B. HARTLEY, likened the service to a morbid pregnancy. Some said that this pregnancy should be terminated now, and indeed many held that it would permanently undermine the health of the mother; in any event the child might be stillborn. What was certain was that the Minister intended to hand the baby, dead or alive, to the profession on July 5. Mr. G. D. FALCONER (Wallasey) thought that the only differences after July 5 would be that patients would be paying the Government instead of the doctor and that doctors would be more busy. Dr. HELME reasoned that lack of personnel was the governing consideration; for in setting up the service another great bureaucratic army would be established which might more usefully be employed on production of food. Dr. D. A. ROBERTSON (Reigate) contended that the honest thing would be for the Government to build health centres and hospitals which could then offer a slowly expanding service as an alternative to that in existence. The decision to initiate the service on July 5 had a political background. The Guildford motion was carried.

The meeting also passed an Edinburgh resolution that in future negotiations special attention should be given to the possibility of introducing the service by stages.

ALTERNATIVE PLANS

Dr. HELME asked the meeting to reaffirm its support for a resolution, passed in 1944, that health legislation should proceed by evolution; that first the N.H.I. scheme should be made to embrace institutional, specialist, and all auxiliary services; and that after this the service should be extended to include dependants of the insured and others of similar economic status. Dr. Helme suggested that if hospitals were given, say, £15 million a year by the Government, they could do much to get rid of their shortages; or the Government might agree to give £1 for every £1 subscribed by the public. The proposed steps were, he maintained, entirely practical; they would constitute no drain on man-power, they would safeguard the voluntary hospitals, and, being completely evolutionary, they would give time for further consideration.

Dr. W. G. MURRAY-BROWNE (Gloucester) said that what was wanted was positive proposals. Dr. E. A GREGG (St. Pancras) recalled that the association had already published its views regarding a nation-wide scheme; and interim schemes had been considered by a committee of the association. Various schemes had been circulated to panel committees, but there had been no general desire for a single, standard form of interim service for the whole country. In some areas doctors wanted to revert to a system of private fees, while in others they sought an extension of existing public medical services.

Dr. HELME insisted that a standard form of treatment was needed; and his resolution was carried.

MIDWIFERY

Dr. R. W. RAE (North Staffordshire) urged that the council should advise that it is not in accordance with the association's policy for practitioners to accept election to the proposed local obstetric committees. All doctors, he said, should take part in the midwifery services; and if matters were adjusted to the profession's satisfaction there would be no need for these committees. Dr. N. J. P. HEWLINGS (Oxford) was in sympathy with Dr. Rae's motion, but at the same time found something to say for the view of the Royal College of Obstetricians that the standard of obstetric practice should be prevented from falling. Dr. Hewlings suggested that practitioners might serve as trainees; but the meeting quickly voiced its objection to this proposal. Dr. Rae's resolution was carried.

The meeting supported a Wakefield resolution, put by Dr. T. GARDNER, protesting strongly against the "closed panel" for midwifery under the new service. Dr. D. L. S. JOHNSTON (Halifax) believed that it might be the forerunner of other limitations on the practitioner's work.

WITHHOLDING CERTIFICATES

Dr. H. W. DONOVAN (Birmingham) pressed for withdrawal of certification before July 5. Dr. DAIN argued that "we are a body of responsible people under contract to give service to insured people." If proper notice were given now, certificates could still not be withheld much before July 5. Dr. H. H. GOODMAN insisted, however, that an expression of willingness to withhold certificates would be a strong weapon in the hands of the council in an emergency. "Is it wise to sit still and wait?" Coercion should not be tolerated without a blow in defence; and each day of purely passive resistance weakened the association's position. The motion was nevertheless lost.

Dr. W. V. HOWELLS (Swansea) put a resolution to the effect that if the profession were advised not to accept service, no certificates other than those for infectious-disease notification, certification under the Lunacy Act, and death certificates should be signed by any member of the profession. In Dr. GREGG's view there could be no more unwise step than this. To refuse certificates would embarrass the patient and would be a grave reproach to a great profession. This was underlined by Dr. DAIN: "I have never heard such an atrocious proposition put up"; whoever was going to be hurt it was not to be the patients. The motion was lost.

Dr. GEOFFREY EVANS (Marylebone) suggested that the approach should be by drawing attention to the fact that the association had at heart the same principles as those to which the Labour party subscribed. He quoted a statement by the national executive committee published in the *Times* of March 3:

> ". . . Democracy cannot live without freedom of speech, press, and organisation; without the right to protection against arbitrary arrest, the right of appeal to a non-political judiciary."

Dr. Evans was supported in his proposal that the executive committee should be asked if the association might look to it for support in obtaining these freedoms for the profession in the National Health Service.

BOARDS AND COUNCILS

For the council Dr. DAIN moved:

That medical members of regional hospital boards, local executive councils, and health committees of local

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authorities be requested to continue their membership of these bodies for the present.

The council, said Dr. Dain, had decided that they should stay because these bodies were approved in the association's policy and they were examining details of a new service; to take them away would possibly mean their replacement by less competent doctors. Moreover, from the association's members serving on these bodies came news of what steps were being taken in the regions.

Dr. J. M. CHRISTIE (Finchley) wished to amend this resolution to make it conditional upon the Government reopening negotiations. The plebiscite, he said, condemned the Act. Without care an anomalous position might arise; and a hostile press or public might fasten on supposed inconsistencies. Dr. DAIN urged that the policy should be left open; it might be altered if circumstances dictated. The Finchley amendment was lost, and the council's resolution carried.

INDEPENDENCE FUND

In the course of the meeting the representatives went into committee. It was announced that they unanimously adopted a resolution by Dr. DAIN in these terms:

> That an Independence Fund be established to help to finance the profession's activities during the present dispute with the Government.

The following have been invited to serve as trustees of the new fund:

Mr. A. Lawrence Abel, Dr. J. C. Arthur, Dr. J. A. Brown, Dr. G. F. Buchan, Dr. R. W. Cockshut, Dr. H. Guy Dain, Dr. W. E. Dornan, Mr. A. Staveley Gough, Dr. F. Gray, Dr. Charles Hill, Lord Horder, Dr. J. A. Pridham, Prof. G. I. Strachan, Dr. S. Wand, Sir Reginald Watson-Jones, Dr. J. B. Miller, Dr. E. A. Gregg, Dr. W. M. Knox, Dr. J. C. Pearce, Dr. W. D. Steel, Dr. D. J. B. Wilson, and Dr. W. Woolley.

In the course of the open meeting the following resolution was referred to the trustees:

> That this meeting does not recommend members of the profession to accept service under an amended Act until such time as sufficient hospital services, specialist services, health centres, and satisfactory conditions of service for doctors and patients are a practical possibility.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH

THE following resolution, adopted by the college on March 15, has been sent to the Prime Minister:

Since its incorporation by royal charter in 1681, the Royal College of Physicians of Edinburgh has endeavoured to fulfil the purposes for which it was founded—namely, to consolidate the medical profession and to improve its standard of knowledge; to advance medical learning and science; and to promote by all means in its power the good health of the nation.

The Royal College of Physicians of Edinburgh shares the desire of the entire community for a National Health Service which will afford to the people the highest standard of medical service attainable. It views with disappointment and disquiet the failure of the negotiating parties to reach agreement.

The college is of opinion that the overwhelming vote of every section of the medical profession disapproving of the National Health Service Act, 1946, in its present form can only be explained by the fear that professional freedom is gravely endangered. The essential fear centres round the power of the Minister to alter by order or regulation the fundamental terms of service of the medical profession.

The college urges in the national interest that negotiations should be resumed and that the matters in dispute be re-examined and adjusted so that the profession will feel able to coöperate with confidence in the development of the comprehensive service desired by all.

SOUTH-EAST METROPOLITAN REGION

THE following have been appointed chairmen of hospital management committees for some of the hospital groups within the region:

Camberwell	Mr. Harold Gibbons, O.B.E., J.P.
Bermondsey and Southwark	Prof. T. B. Johnston, C.B.E., M.D.
Greenwich and Deptford	Mr. E. C. Sherwood
Lewisham	Mr. Walter R. Owen, J.P.
Woolwich	Alderman S. C. C. Harris
Sidcup and Swanley	Dr. C. W. Brook
Dartford	Mr. W. L. Parry
Gravesend and Medway	Alderman R. W. Rule, J.P.
North-east Kent	Alderman the Rev. Harcourt Samuel
Tunbridge Wells	Alderman R. H. Burslem, J.P.
Orpington and Sevenoaks	Mr. Henry J. Lester, J.P.
Bromley and Farnborough	Mr. Arthur Collins
Hastings	Councillor Mrs. A. W. Farnfield
Eastbourne	Mr. G. F. Bowes
Brighton and Lewes	Mr. J. C. Gaukroger
Seamen's	Mr. F. A. Baker

AUSTRALASIA

FROM OUR OWN CORRESPONDENTS

ROYAL AUSTRALASIAN COLLEGE OF SURGEONS

THE 21st annual meeting of the college was held in January under the presidency of Prof. Gordon Bell at Dunedin which is celebrating its centennial year. Sir Hugh Cairns, the first Arthur Sims Commonwealth travelling fellow of the English college, was the visitor and gave the Syme oration. Sir Charles Hercus and Sir Hugh Cairns were made honorary fellows. Fellows from Australia included Mr. Victor Hurley, Mr. W. A. Hailes, and Mr. Balcombe Quick.

A REPUTED CANCER CURE

The claim of 78-year-old John Braund, of Sydney, to cure cancer has been given wide publicity and has raised hopes in many sufferers both in Australia and abroad. It is reported that a number of persons are coming from Canada and other places to be treated by him.

Mr. Braund is an unqualified practitioner who is said to have practised for some years in Victoria and New South Wales as an itinerant healer, being at one time found guilty, under the Medical Practitioners' Act of New South Wales, of assuming the title of a registered medical practitioner. His claims came into prominence at the end of last year and received so much press publicity that the State government set up a special committee to investigate them; but he has given this committee little coöperation. An offer of £20,000 to set up a clinic was made by a well-meaning business man but was withdrawn. Mr. Braund also states that a business concern in Melbourne proposes to establish a clinic there for him, and according to newspaper reports he is undertaking the treatment of a "blue baby."

A film demonstrating Mr. Braund's methods has been made and is appearing in various picture-theatres. It shows him massaging a patient's legs as an integral part of the treatment, which consists mainly, however, in the injection of some solution beneath the skin. The formula of this solution is secret, but Mr. Braund has stated that it will not die with him as he proposes to send it to the Prime Minister of Great Britain. The picture shows him lifting a slough from the abdominal wall with a pair of forceps. This is supposed to be a cancer which has been drawn to the surface from the liver.

A Sydney newspaper, the *Mirror*, has offered Mr. Braund £2000 if he can cure cancer, and will raise this to £5000 if, as he states, he can draw a cancer of the liver to the surface and remove it. In an editorial the *Mirror* gives its opinion that "he has no more ability to diagnose and cure cancer than Hottentots from the jungles of Africa."

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In England Now

A Running Commentary by Peripatetic Correspondents

ONE of the bits of advice that I hope to hand on to my sons when they come to set up house is that in choosing a dog one should consider the colour of one's stair-carpet. To keep a large off-white dog, as we do, when your stair-carpet is a plain royal blue is asking for constant trouble. For it is quite a mistake that dogs moult only at certain short seasons; ours gives off an effluvium of hairs all the year round, with a smart exacerbation on Saturdays after I have given the stairs their weekly vacuum-cleaning.

The ideal, no doubt, is to have a patterned stair-carpet and to choose a dog if not of the same pattern, which may be hard to find, at least of the same colours, so that a handful of fur will pass as a variation in the design. Failing that, dog and carpet should tone with one another; you can have either a dark carpet and a dark dog or both light. There is one snag in this: if the dog exactly matches the carpet you may step on him when coming downstairs, and if he is a quiet dog you may lose him in the darker corners of the landing.

If you are lucky enough to have carpets in your rooms as well as on the stairs a correct match is still more important; chair-covers, sofas, and bedspreads (if you allow your dog in the bedrooms) do not matter so much, because dog's hairs do not dig themselves into these things as they do into carpets. It may be very awkward if you have different colour-schemes about the house. If—to take an extreme example—your rooms are carpeted in pale beige and your stairs in nigger brown the only solution is to change over to some hairless pet; a pig might do, but to be on the safe side I would recommend either a tortoise or a snake.

When I told Jones about this he said he would extend my advice to include wives, since they also scatter their hair about on newly-hoovered pile. But I think he is going too far. In my experience wives do not moult like dogs; and the young man with brunette furnishings who marries a blonde can always train her to wear a hat except in the kitchen and bathroom.

* * *

In British hospitals cups of tea are almost as frequent as the hours of the day. The ritual has multiple origins—the general British habit of tea-drinking at all hours, the hospitality of Sister, the late-rising and breakfast-rushing resident who requires some supplement in the mid-morning, the reward for a good bit of emergency work, and, of course, the belief that a long O.P. or op. list entitles all, from the honorary to the junior pro, to a break for tea. Some at least of our hard working American colleagues look on such cups (of coffee) as a waste of time—perhaps one reason for the fountains (water, not soda) in every corridor and corner of their hospitals.

I may be wrong, but I think that the habit of a fly cup of tea and something to eat has grown in our lean years. I was surprised to find that three meals a day, without any intermediate supplements, satisfied me in the U.S.A., my usual being the same plus at least three tea supplements. A chance remark to a transatlantic internist drew forth a sympathetic reply in terms of gastric physiology: "The British diet is low in fats and is or was high in carbohydrates; the stomach passes carbohydrates rapidly, fats delay stomach emptying; don't forget that 11 o'clock feeling after Scots porridge." This stimulated some more reflections. How many sweet-renouncing, pipe-chewing fathers are now secretly consuming their own sweet ration that Junior (sorry, little Tommy) envies? How many spreads, fatalistically attributed to middle age, are in fact due to an excessive carbohydrate intake? Personally I have actually lost my spread—along with my three teas plus a little something—since I came to the land of plenty.

* * *

According to a newspaper report, a learned judge, castigating a witness, said lately that in his long experience he had found that anyone who did not look him straight in the face when giving evidence (as in this instance) was shifty, untruthful, and untrustworthy. In my personal view, and that of a few of my colleagues and friends, reluctance to look one's hearer in the face is generally due either to inherent shyness or to a visual defect, such as squint, giving rise to a natural if unconscious desire to hide one's physical disabilities from one's neighbour. A swindler or other professional liar will, if he takes his job really seriously, train himself from the beginning to look his audience (or victim) straight in the eyes. From childhood I have suffered from a moderate divergent squint and diplopia, and I have a resultant disinclination to look people in the face (even with the fixing eye); on occasion I have to force myself to do it. But I think I am reasonably honest and truthful. I have never been hauled into court except as a medical witness; and, like most of my fellow men, I do not think I would tell a whopper except under great provocation (such as that occasionally arising in a Japanese internment camp, of unhallowed memory). I can only hope that the judge has been misreported.

* * *

Several of us class I supernumerary types at this Famous and Venerable Teaching Hospital are unanimous in our approval of your peripatetic correspondent's idea for the better selection of candidates for the senior staff. In fact, we couldn't agree more. Initially we wondered whether one of us was cashing in on his literary talent to augment his £450 and help to finance his wife and 2·5 kids, two rooms and "use of," a car, a new suit for the censors, and lectures at the Royal College at seven guineas a crack. But then we realised that another F.V.T.H. may well be undergoing the same academic decay as ours. One of our colleagues called it mental stenosis, but he has Membership and can afford to be subversive.

Nowadays the chat at the tea-table has degenerated, even on Thursdays when the Unit isn't there. No longer do we discuss prothrombin times or the latest leading article in *Acta med. scand.* There is now sinister talk of the desirability of some new brooms (perhaps vacuum cleaners would be too unkind); we muse on the days when medicine was really taught, when the epigram and aphorism were teachers' weapons. We hardly care to think how the student fares, but we do deplore this lack of postgraduate teaching.

(PS.—Did you hear that old George got his Membership? He did a course at that county-council hospital.)

* * *

The occasion was a written examination in medicine, and the precipitating factor a question dealing with the medical treatment of thyrotoxicosis. Recent anti-thyroid drugs provided the staple theme for most candidates, and the large number of substances described made your correspondent feel that organic chemistry was indeed a rapidly advancing subject. The list is appended:

Thyrouracil	Thyurasol	Thiourocil
Thyouracil	Thio Uracil	Thiouricil
Thyouricil	Thio-uracil	Thiouracyl
Thyourocil	Thio-urecil	Thiouricyl
Thyourasol	Thio-uricil	Thioeuracil

Any manufacturer of thiourea derivatives desiring a name for further compounds is invited to select one from this list. The first-named is strongly recommended as conveying an idea of the chemical structure together with a strong hint of its pharmacology. In addition to the present selection, by suitable combination and permutation at least 350 more compounds could be decently christened.

* * *

Contemplating the small part of my flat which can legally be redecorated, and the proposed restrictions on dental work, I wonder how long it will be before the Minister applies a restriction to plastic surgery. Clearly a licence will soon be necessary to perform more than £14 worth of this other kind of reconstructive work. I can foresee that licences will normally be granted only for war damage and to those whose income depends on their face and figure. Then, of course, there will be special facilities for the renewal of beauty intended for export, and highest priority will be given to salesmen requiring a particularly trustworthy and persuasive physiognomy before proceeding to earn dollars overseas.

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Letters to the Editor

INFANTILE PARALYSIS CENTRES

SIR,—The difficult transitional period before and after the introduction of the National Health Service Act may lead to inadequate planning of hospital facilities for the treatment of cases of poliomyelitis, in both the acute and chronic stages.

The year 1947 witnessed the establishment of the virus of poliomyelitis in this country on a greatly increased scale, and signs are not lacking that the disease may continue to be active this year. Whether the incidence in 1948 will compare with that in 1947 is immaterial from the point of view of future planning, since it is certain that we can expect epidemics, large or small, in the years to come.

Orthopædic resources throughout the country must at present be severely strained by the number of long-term cases from last year's epidemic. There appears to be urgent need for the building of infantile paralysis centres on the lines of those in the United States of America.

Middlesex Hospital, London, W.1. DOUGLAS MCALPINE.

VISCERAL PAIN

SIR,—Kellgren and Lewis [1] have shown that visceral pain is felt in the somatic tissues of the corresponding spinal segment and should be regarded as similar to the pain caused by suitable stimuli acting on the deep somatic structures of the same segment. By day-to-day experience painful stimuli to the superficial tissues are accurately localised, and this ability has proved serviceable in the history of the development of the species; but there is only imperfect phylogenetic development of the localisation of deep pain, which is poorly represented in the sensorium. Accordingly, such deep pain is "projected" to more superficial tissues in the corresponding sclerotome, from which the organism is more accustomed to receiving painful stimuli. Head and Holmes [2] postulated that, in the light of experience, each individual formulated a "body image" in terms of which all acts are initiated and all sensations interpreted. Riddoch [3] suggested that there were three body images—one for postural sensibility, one for cutaneous sensations, and one for visual sensations, all three being normally integrated into one concept in the sensorium. Under abnormal conditions dissociation may occur—e.g., in cases of hemiplegia where the subject feels that he can move the affected limb although his visual-image concept argues to the contrary. Similarly with the "phantom limb" there is dissociation of the compound body image; the visual element is aware that the limb no longer exists as part of the individual, yet the limb may be "felt," sometimes painfully, and the subject may have the feeling that he can initiate movements, the impressions being most vivid of parts which have been fully trained—e.g., the fingers and the joints. As the limb "shrinks" with the passage of time, it is in these parts that the bodily-image memory persists longest. Clearly then, when the body image of sensation continues relatively intact, deep pain, somatic or visceral, may be referred to the phantom, as in the cases recently reported by Prof. Henry Cohen.[4]

There is some disagreement as to whether or not superficial anæsthesia can abolish or diminish deep pain. Weiss and Davies [5] favoured the view that such abolition was possible, but Lewis [6] was unable so to modify the pain of an anginal attack. Woollard, Roberts, and Carmichael [7] could not abolish the referred pain of phrenic avulsion by anæsthetisation of the area of reference, and in your columns Mr. F. R. Brown [8] has reported confirmation of this observation. Now it may be, as Mr. Brown suggests, that shoulder pain in phrenic avulsion is modified by anæsthetisation of the shoulder because of the abolition of subliminal stimuli from the cutaneous area. To me, however, a more likely explanation is that this anæsthetisation produces a temporary and partial dissociation of the compound bodily image, the degree of suppression of the sensory element varying with the extent of anæsthesia and with the individual subject. A personal observation is perhaps relevant.

During the recent very cold weather I decided to open the metal radiator taps on my motor-car. On returning to the warm, I found that the two fingers employed had become blanched and completely numb. I was able to view them quite objectively as something which, for the moment, did not belong to me; a dissociation of the bodily image had temporarily occurred. Under such circumstances it was difficult to conceive of any reference of pain or other sensation into the affected parts, which for the moment had become part not of the body but of one's environment. With the return of circulation and the consequent pain, the sensation rapidly passed. Several colleagues tell me that they have noted similar experiences.

In the case-histories quoted by Professor Cohen, relating to two patients who suffered from both angina pectoris and phantom-limb sensation of the left arm, anæsthetisation of the brachial plexus lessened the severity of the limb pain and delayed its appearance in severe anginal attacks. It is suggested that this change resulted from the further dissociation of an incomplete bodily image in these cases. That artificially induced painful states in homosegmental areas resulted in production or increase of anginal pain is to be explained on a basis of central summation of painful stimuli, whether the somatic element be produced by skin blistering or initiation of deeper structures by injection of hypertonic saline.

Sherrington [9] emphasised that the central nervous system functions as an integral whole and every subsequent study has confirmed this view. In observations on pain mechanisms it is essential to bear this in mind and avoid the pitfall of attempting to explain all the observed phenomena on the basis of peripheral functioning to the exclusion of due consideration of the rôle played by the sensorium. At present some aspects of the problem are more readily understandable from the philosophical than from the physiological standpoint, and the way of progress may lie along the former lines.

London, W.2. J. DONALDSON CRAIG.

PANCREATIC FUNCTION IN NUTRITIONAL ŒDEMA

SIR,—I read with great interest Dr. Davies's article on kwashiorkor in your issue of Feb. 28. I should like to present some confirmatory data on pancreatic function in a similar condition—nutritional œdema. We had ample opportunity to observe such cases after the siege of Budapest, when there was no milk or any other source of complete proteins.

The very first change observed, at a time when blood protein and hepatic function were still normal, was a decrease in the output of pancreatic enzymes; and soon secretion of these substances ceased almost completely; their concentration in the blood also fell considerably. Then diarrhœa set in, the liver increased in size, and the Hanger and the Takata tests became positive; but there was no shift as yet in the Weltmann test. This stage lasted several weeks during which anæmia, increase of reticulocytes, and progressive reduction of plasma albumin were noted. If milk could be given, the condition improved at once; the pancreas began to secrete and the size and functions of the liver became normal. If, however, no protein was to be had, œdema set in. The younger the infant, the sooner œdema appeared. Most infants observed were already in this stage when admitted, showing all the classical signs of *Mehlnährschaden*; enzymes were lacking, except small amounts of amylase, and there was a shift to the right of the Weltmann band; changes in the liver and pancreas found at necropsy closely corresponded with those observed by Dr. Davies.

The condition could not be ameliorated by vitamins A, D, or B_1 or by riboflavine, pyridoxine, nicotinic acid, or the B_2 complex. Results with small amounts of milk

1. Kellgren, J. G., Lewis, T. *Clin. Sci.* 1939, **4**, 47.
2. Head, H., Holmes, G. M. *Brain*, 1911, **34**, 102.
3. Riddoch, G. *Ibid*, 1941, **64**, 197.
4. Cohen, H. *Lancet*, 1947, ii, 933.
5. Weiss, S., Davies, D. *Amer. J. med. Sci.* 1928, **176**, 517.
6. Lewis, T. Pain. New York, 1942.
7. Woollard, H. H., Roberts, J. E. H., Carmichael, E. A. *Lancet*, 1932, i, 337.
8. Brown, F. R. *Ibid*, March 6, p. 386.
9. Sherrington, C. S. The Integrative Action of the Central Nervous System. New York, 1906.

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were not satisfactory and it was felt that such feeding enhanced deterioration. Adequate amounts of milk always brought relief in a few days. Pancreatic secretion became normal within 3 or 4 days; this was soon followed by a rise of the plasma-albumin level, and then the œdema subsided. In fresh cases this occurred in about 10 days but in neglected ones it took much longer, and in these patients liver-function tests remained pathological for many weeks. The secretion of enzymes seemed to depend on feeding with complete proteins; the pancreatic dysfunction ceased as soon as milk in generous quantities was given but returned if it had to be discontinued. Parenteral administration of proteins gave much less satisfactory results.

These observations were reported in detail at the Fifth International Congress of Pædiatrics, held in New York last July.

1st Department of Pædiatrics, University of Budapest. P. V. VÉGHELYI.

INCIDENCE OF CARCINOID TUMOURS

SIR,—In your issue of March 13 Mr. Fraenkel writes: "Carcinoid or argentaffine tumours of the intestine are comparatively rare, receiving scanty mention in most textbooks. Probably not more than 400 cases have so far been described . . ." We write to suggest that these growths are less rare than this statement indicates.

Describing them in his new book *Pathology of Tumours* Willis[1] suggests that "They occur nearly as frequently as the adenocarcinomas" in the small intestine; they are often multiple, and they metastasise like other intestinal carcinomata. We suggest that these argentaffine growths are as well known to surgeons as to pathologists. Our experience is that after section at operation or at post mortem, and whether submitted for histological examination or not, they are seldom the subject of communications to medical journals since their occurrence and natural history are generally understood. Similarly, failure of surgeons or pathologists to submit all intestinal growths (and their metastases) to histological examination will lead to not a few argentaffine growths being considered non-argentaffine, since in some there may be almost complete absence of the pigmentation commonly described. Our last two cases were of this kind: one was a solitary growth in the jejunum causing obstruction in a woman aged 53; the other was an "inoperable" growth of the cæcum with multiple abdominal lymphatic and hepatic metastases in a man aged 75.

London, N.18. J. F. HEGGIE.
Northampton. R. M. HEGGIE.

TUBERCULOSIS

SIR,—Dr. Toussaint, in his letter of March 13, confirms the criticism which I made of the mass-radiography scheme as soon as it was launched. My paper, which was rejected by a medical journal in 1942 with the explanation that it "might have an unfortunate effect just when an effort is being made to promote greater interest in the use of radiology," contained these words:

> I would point out that our knowledge of radiographic diagnosis has not been materially improved during the war. We knew as much before as we know now. Yet, though X-ray units were then easily available, we did not urge such a scheme; and again I would suggest that the words of the late Wilfred Trotter would seem to be applicable to the present agitation for a scheme of this nature. "Panic has an immediate effect in weakening rational judgment. Every conclusion arrived at under its influence, however plausible it may seem, in that deceptive medium, will be corrupted by departure from sound sense—the point is that decision bearing the diagnostic marks of having been affected by panic should be reviewed without mercy or any regard to the saving of face."[2]

Now that the fallacies of the scheme are being more widely appreciated, is it not time for an effective review?

Two years ago I advised how the small number of units available could be economically used to greater effect on certain groups.[3] To this small number of groups Dr. Toussaint has added another—i.e., "all hospital admissions, inpatient and outpatient." To this I wish to express my strongest disapproval. In these days of privation and shortage in particular, patients should be admitted into a general hospital only because of some clinical manifestation, and it is this which should dominate the investigation and treatment. Obviously, if there is any indication of pulmonary disease radiographic examination will form part of the clinical investigation—except in emergencies it could reasonably have been done before the patient was admitted to hospital. The tendency to use radiography as a quick method of diagnosis and to treat its findings rather than the clinical condition of the patient is a retrograde step. It was such behaviour which led to surgical measures on a symptomless patient whose radiograph was interpreted by the chest specialist as showing acute tuberculous cavitation when it was in fact due to a lock of hair lying over the apex during the radiography.

I have evidence which proves that spectacular radiographic appearances tend to eclipse essential features of health and disease. Thus:

1. Spectacular radiographic features may and do excite surgical activity, though more careful attention to the patient's clinical condition would yield evidence strongly contra-indicating surgery but calling for prompt measures in other spheres.

2. Radiographic features of massive lesions may be present in a patient who feels fit and has no clinical signs or symptoms—what I have called the "positive radiographic symptomless period." Such a radiograph gives no indication whether or not the disease will be reactivated by surgery and all that it entails; but it may check or hamper the surgeon in carrying out urgently needed surgical measures for other conditions.

3. Radiographic features of massive lesions may be present in a patient who has signs and symptoms due to other conditions than those indicated on the radiograph, yet the latter may be allowed to dominate the picture.

4. The radiographic appearance may not indicate any departure from the normal or it may give evidence only of healed disease; yet it may be allowed to dominate treatment, though a careful clinical examination may reveal definite clinical signs and symptoms even of great gravity—the "latent negative radiographic period" of primary disease or reactivation.

5. The serious "emergency" will necessitate closer contact with the nurse, yet be too ill to permit of routine radiography.

As a measure for preventing the spread of tuberculosis from patient to nurse, radiography is of relatively little value. To say that nurses do not contract tuberculosis when they nurse patients with open disease of which they are acquainted, yet contract it from patients who have unsuspected tuberculosis, ignores the fact that a proportion of nurses who, fit and free when admitted as probationers, nurse tuberculosis in sanatoria designed (which most general hospitals are not) for the treatment of tuberculosis contract and die of the disease.

This is an acknowledgment of the poor training in the preparatory school, which has failed to teach the nurses how to protect themselves from disease in patients they may be called upon to treat, though much time may have been wasted trying to teach anatomy, physiology, and hygiene to a standard far higher than the time permits or their position requires. When, many years ago, it was decided to treat typhoid fever in general wards it was suggested that the infected patients' bed-clothes, feeding utensils, &c., should be of a distinctive colour, but the suggestion was defeated by the enlightened physicians of the day, who pointed out that there should be no distinction; for nurses must be trained to realise that the excretions, &c., of any patient may contain infectious material, and that it was a sign of incompetence and negligence on their part if they did become so infected.

Contacts with patients are but one source of infection. There is no suggestion that the friends and relatives, who are just as likely to be infected, be X-rayed as they enter the hospital; and there is no check on the nurses' contacts outside the hospital. The expense involved in this incomplete preventive measure is out of all proportion to the good likely to be secured. The expenditure of the same amount in improving the food and conditions of the nurses would give a better protection in a much happier way.

1. Willis, R. A. Pathology of Tumours. London, 1948; p. 414.
2. *Publ. Hlth, Lond.* 1943, 56, 117.
3. *Lancet*, 1945, ii, 808.

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Nurses found to be free of tuberculosis on X-ray examination may have already contracted the disease, for there may be a long latent period between contracting the disease and the appearance of radiographic signs of it. Some persons contract the disease and die of it within a few months of a normal radiograph; consequently a yearly or even half-yearly examination will only catch disease in the less susceptible or in those infected with the less virulent organism.

As an alternative scheme I would suggest that:

1. Only patients with clinical history, signs, and symptoms of disease of the respiratory tract should be sent for radiography as part of their clinical examination.

2. In the training of nurses in the preliminary school the greatest attention should be paid to the essentials of nursing.

3. Any money available for the scheme to prevent nurses contracting tuberculosis should be devoted to the provision of better food and conditions for nurses.

4. No case of open tuberculosis should be admitted to a general hospital, and when discovered in the hospital a case should be transferred as promptly as the patient's condition and accommodation permit.

Birmingham. JAMES F. BRAILSFORD.

NICOTINIC-ACID TOLERANCE TEST

SIR,—Since the amount of nicotinic acid by mouth needed to produce vasodilatation is so variable in a normal subject, the test reported by Dr. Erdei on March 6 is of little value in assessing liver function. If the test he describes is carried out immediately after a meal, at least 500 mg. may be taken by a healthy person without any apparent effect; whereas 100 mg. taken two or three hours later usually produces in a few minutes a diffuse and unpleasant flushing.

Now that nicotinic acid is being widely used as a vasodilator in a variety of conditions, this point is of some importance. I would like to suggest that vasodilatation occurs only when the rate of absorption exceeds the liver's aminising capacity.

London, S.W.1. G. E. SPEAR.

GASTRO-ENTERITIS IN INFANTS

SIR,—The diarrhœa and vomiting of infants under one year of age has been the subject of much discussion.[1] There seems to be some measure of agreement that otitis media precedes the diarrhœa and that bronchitis or bronchopneumonia also occurs at some stage. Many varieties of bacteria have been isolated from these cases and a virus has been suggested as the causal agent.[2]

In a great many of these very ill children a coagulase-positive staphylococcus has been isolated from the middle ears, lungs, empyema, or rectum at autopsy; from the nose, throat, or rectum during life; and, in some cases, from the mastoid, incised ear-drum, or ear discharge at operation. Treatment with penicillin and/or sulphonamides effects considerable improvement, but the mortality is still high. I should like to suggest that staphylococcal antitoxin be tried—preferably in a controlled and extensive series—where pathogenic staphylococci have been isolated from one of these sites at an early stage in the disease; penicillin and sulphonamides should not be withheld. Staphylococcus enterotoxin would not be neutralised, of course. The use of staphylococcus antitoxin has hitherto not been tried or suggested for these cases, and to that extent its value might be judged hypothetical. But it is known that under certain circumstances staphylococci produce a potent exotoxin, and I am of the opinion that the administration of staphylococcal antitoxin might be life-saving in these young children who are unable to manufacture their own immune bodies.[3] There was nothing hypothetical about the Bundaberg disaster.

Pathological Department, St. Margaret's Hospital, Epping. FRANK MARSH.

1. *Lancet*, annotation, 1946, ii, 951. Stern, D. M. *Ibid*, 1947, i, 80. Cook, G. T., Marmion, B. P. *Brit. med. J.* 1947, ii, 446. Discussion on the Association of Otitis Media with Acute Non-specific Gastro-enteritis of Infants. *Proc. R. Soc. Med.* 1948, 41, 1.
2. *Brit. med. J.* annotation, 1947, i, 187.
3. *Lancet*, annotation, 1947 i, 72.

CERVICAL-ROOT IRRITATION

SIR,—I wish to thank Dr. Kelly for his criticism (March 6) of my letter of Dec. 13. I shall attempt to explain why his formidable bibliography loses much of its value.

"Enormous and grotesque" osteophytic outgrowths on the anterior surfaces of the vertebral bodies may well exist with no further ill effect than local pain. On the other hand, osteophytes of such "dimensions" encroaching upon the intervertebral foramina (the transverse diameter of which, at rest, never exceeds 1 cm.) are impossible without neurological effects. If the disc gives way, movement at the posterolateral angles of slightly hypermobile contiguous vertebral bodies and large osteophytes which develop at such a site of friction, necessarily endanger the fibres forming the roots. With osteophytes of moderate size, the foramen may still accommodate the root at rest, yet friction and even crushing by the sharp and irregular osteophytes of the root and ganglion may occur *during movement*. If the whole cervical spine is removed at post mortem it is possible to demonstrate some of the effects of our numerous movements in health.

Semmes and Murphey,[1] who operated under local analgesia on 3 patients for the removal of prolapsed cervical intervertebral discs, demonstrated the symptoms of irritation of the root affected; coronary thrombosis had originally been diagnosed in 2 of these patients, both medical men.

Ankylosing spondylitis may be painless, especially in the latest stages when maximal ankylosis occurs if the patient lies completely at rest; pain occurs during movement. (It may be worth mentioning that von Bechterew's disease is spondylitis deformans associated with root damage, and not spondylitis ankylopoietica.) Ankylosis of two or more adjacent vertebræ, after separating the component bones forming the intervertebral foramina by prolonged extension, is one method of preventing the crushing of the roots during movement. It also prevents overriding of a vertebral body which may directly or indirectly irritate and then damage the cord, even in cases where the disc has prolapsed laterally.

A prolapsed intervertebral disc produces a *derangement* of the spine. It should not be regarded as the same as a slowly growing extradural tumour; neurofibromata may even enlarge the intervertebral foramen. The discs are normally an integral part of the spinal column and are essential in maintaining fixation of the spine for movements of the head, ribs, and limbs, and for coördinated activities of the spinal column itself. With prolapse into the spinal canal the disc may act as a suddenly appearing extradural tumour or foreign body to which the related structures have had no opportunity of adapting themselves. Consideration should also be directed to the effects on the spine of the approximation of vertebræ by lax muscles and ligaments, the secondary effects of osteophytes and fibrosis (both at rest and during movement), and the further damage to roots and weakening of those spinal muscles which the roots themselves supply.

The frequency with which a prolapsed cervical intervertebral disc is to be found in the many patients complaining of pain in the neck, thorax, and arm has not yet been determined. One feels, however, that the symptoms of cervical-root irritation are often encountered though missed for several reasons. The widely distributed loss of muscle-fibres may even be maximal in those muscles which are least amenable to accurate clinical examination; hence the patient appears to suffer from a "disease of symptoms rather than of signs." Yet, although the effects may have developed, our powers of recognising them may be at fault. Prolapse of a cervical intervertebral disc may take place alone or together with other prolapses in the cervical or other parts of the spine. Other injuries may be sustained simultaneously and may overshadow the disc lesion. There seems a special tendency to disregard such a lesion when it occurs in a spine previously scoliotic and in which, during middle life, evidence of more generalised osteo-arthritis develops.

It is difficult if not impossible to examine in detail the muscles supplied by the posterior primary division, which are extremely important in maintaining local integrity and in coördinated movement of the spine; and it is also difficult to examine the scalenus medius et posterior, partly supplied by the 7th cervical anterior primary division. All these muscles may be affected bilaterally, in which case there is no basis for comparison; they may be hidden by other healthy muscles supplied by the spinal accessory and other

1. Semmes, R. E., Murphey, F. *J. Amer. med. Ass.* 1943, 121, 1209.

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cervical nerves. Then muscles covering the trunk in the form of thick sheets but themselves covered by fat, such as the latissimus dorsi at the back and (especially in women) part of the pectoralis major on the front of the chest, have proved another cause of uncertainty in diagnosis.

Where C8 and possibly T1 roots are affected the distal effects upon the limb (more easily measured) have resulted in a diagnosis of peripheral neuritis and in the statement that with this disorder the long nerves to the limbs are usually maximally involved. Because of our inadequacy in testing the integrity of the shorter branches from the roots to the neck and trunk muscles—branches which are anatomically "peripheral" nerves—we have interested ourselves chiefly in the long nerves, such as the median, to the forearm and hand. Yet both short and long nerves contain sensory and motor fibres; the median is, however, further concerned with skin innervation. More attention is paid when an extensor plantar response—evidence of severe cord damage—is obtained. If the paralysis is severe the pain may be entirely cervical, though during the process of its development the "vague" pains and paræsthesiæ may be due to irritation of the long tracts in the cord. But whether the neurological damage is slight or severe, osteo-arthritis may yet develop at a later date. This feature should be borne in mind before recording as "cured" the many cases in which symptomatic improvement is obtained after resting the irritated and œdematous roots by keeping the patient in bed.

I suggest that the diagnosis and successful treatment of root lesions would be most effectively accomplished by considering the combined contributions of experts in the many branches concerned with the problem. To neglect the contributions of any one of them is to perpetuate, if not a "neuro-dilemma," at least an incomplete mosaic.

London, N.4. I. H. MILNER.

THE PATIENTS' HOSPITAL

SIR,—The Patients' Hospital is a contradiction, however admirable the demands made in its name. As we approach this wrong ideal, we find the hospital turning into a kind of hotel. The Doctors' Hospital is no less of a contradiction. As we approach this equally wrong ideal, we find a club for experimental physiologists. The Occupational Therapists' Hospital, the Medical Students' Hospital, and the Clerical Staff's Hospital (to name a few at random out of many) are contradictions likewise.

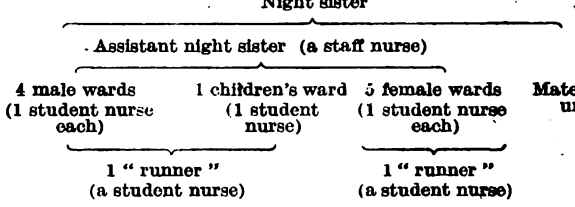
We shall have made a signal advance when everybody recognises that a hospital neither is "owned" by, nor exists for, any artificial group, but is a place for the carrying out of several difficult processes.

The first of these is the collaboration of patient and doctor in a full and careful history and examination. Next come special investigations, and treatment (including rest); but without the first these are futile, and so is every solicitude you please. The measure of a hospital is the facilities which it has for these processes, and the respect which everyone in it accords to them. By this measure, our hospitals do not make any great showing: indeed if they were to do so, there would have to be a transformation. Hospitals would be built in quiet places. No sources of loud noise would subsequently be permitted near them: aeroplanes would not be allowed to fly over them. The wards would be small, and to each of them would be attached a supremely important room, the Examining Room. To this every patient who was well enough would be taken for his first interview with the doctor, as well as for any lengthy subsequent interviews. There neither party would be embarrassed by neighbours within earshot, nor by the patient's public bodily exposure—mitigated (more often symbolically than actually) by screens. In the rare instances in which the doctor had to interview the patient in the ward—and they would be rare enough for this to be enforced—there would be real silence. It would be the gravest breach of hospital etiquette for anyone to interrupt, save for urgent reasons, this central function. The doctor would make, and keep, an appointment for the interview; the nursing staff would have installed the patient in the Examining Room, and would have explained to him the nature of the laborious but invaluable task which he was about to share with the doctor.

Of course all this effort would tend to the individual patient's good; but I would deny even that it should be much more for his sake than for the sake of many other people, such as future patients, medical students, clinical research-workers, pure scientists—mankind in fact. Hence the harmful fallacy in the "Patients' Hospital." It is the processes which count, and they are for everybody.

Copse Hill, Wimbledon. W. J. PENMAN.

SIR,—I am a male nurse, of 18 months' experience, who has just finished a period of night duty. An account of the last night of that period may be of interest. The staff on duty was:



The runners have to assist with "backs," relieve for meals, and fetch and carry generally. Each nurse is supposed to have two breaks of half an hour for meals, between 10 P.M. and midnight, and 1.30 A.M. and 3.30 A.M.; it is obvious that this was impossible on this particular night.

I was in charge of the male acute surgical ward, and the runner for the male wards was also, fortunately, based on this ward. Events ran as follows:

8 P.M. Read day report and take over from day staff; 23 patients, one very noisy, and trying to get out of bed, one still in operating-theatre. 8.15 P.M. Take 4-hourly temperatures. 8.40 P.M. Prepare ward for night and do "backs"; interrupted almost at once by return of patient from theatre (a colostomy aged over 70).

9 P.M. Lights out. Runner departs to assist elsewhere. 9.45 P.M. Give 3 injections of penicillin and 3 doses of sulphonamide drugs. Runner returns.

10 P.M. Night sister's round. 10.10 P.M. Send runner to relieve nurses for first break. 10.20 P.M. Message to admit patient, aged 26, with perforated appendix. I prepare accordingly. 10.30 P.M. Above patient arrives in ward. 10.40 P.M. Doctor arrives to examine him: patient is for immediate operation. 10.55 P.M. Begin to prepare patient.

11.5 P.M. Runner returns to assist. 11.15 P.M. Give sedative injection to noisy patient (no effect). 11.20 P.M. Relatives of noisy patient arrive (at least I can take my eyes off him). 11.30 P.M. Runner takes patient to theatre. Prepare bed for return of patient. Speak to visitors. See to colostomy patient.

12.5 A.M. Start midnight report (should have been finished by now). 12.15 A.M. Patient returns from theatre. 12.30 A.M. Runner makes tea for visitors. Write some more report. 12.40 A.M. Night sister returns to give noisy patient paraldehyde per rectum. 12.50 A.M. Finish report and hand it in. Visitors depart.

1 A.M. Penicillin injections again (with tea for each victim). Ward now quiet for first time. 1.30 A.M. Go for my supper (15 minutes). Runner then goes to relieve other wards.

2 A.M. Sulphonamides again. Renew a dressing. Give oxygen to colostomy patient (he ought to be sat up now, but I can't do it on my own). Attention can now be paid to some of the other patients, neglected all this time.

4 A.M. Penicillin again. Start doing "backs" of those who happen to be awake.

5 A.M. Lights on. Start to take all temperatures. Runner gives out washing-bowls, and washes very ill patients. 5.50 A.M. Write additions to report.

6 A.M. Sulphonamides again. Tea for all patients (luckily an up-patient does this for me—runner is away collecting reports). Finish backs and tidy beds (am supposed to make at least 10 properly: haven't time). Treatment for certain patients.

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7 A.M. Penicillin again. Tidy ward for day staff's coming. 7.20 A.M. Start writing full night report. 7.30 A.M. Day staff arrive (2 nurses and 2 ward-maids) but I have not nearly finished my report.

This is only the bare bones of the work and leaves out most of the stuff of nursing, such as bed-pans, intake and output charts, and many other matters. It was, of course, an exceptionally hectic night—easily the hardest in my three months—but such a night is not uncommon, on one ward or another; nor is the shortage of staff. I am not complaining for myself; I love the work; but such a state of affairs is unfair to the patients, and the risk of forgetting something vital in the hurly-burly is too great.

In this hospital special preparation for doctors' rounds is not, I think, a preoccupation of the nursing staff and has nothing whatever to do with the hour at which patients are roused in the morning. 5 A.M. is early, certainly, and a long time before breakfast at 8 A.M. On the other hand, 9 P.M. to 5 A.M. is 8 hours, and our patients do get tea to bridge the 3-hour gap. On a normally quiet night a patient should be able to get enough sleep in the time allowed.

Having been a public-schoolboy and an infantry officer, I find myself at 33 years old with more responsibility than I have ever had in my life. It is not unlikely that such a night as I have described may next time fall to the lot of a girl of 18 or 19, barely out of school, who may have even less nursing experience than I have.

STUDENT MALE NURSE.

AVOIDANCE OF GONOCOCCAL ARTHRITIS

SIR,—Seldom a month goes by without the admission to these wards of one or more patients who have developed arthritis after gonococcal infection which has apparently been adequately treated. In quite a high proportion of cases there is a history of arthritis following a previous attack of gonorrhœa.

It does not appear to be sufficiently realised that a patient who develops arthritis during or after gonococcal urethritis will almost certainly develop this complication if he contracts gonorrhœa subsequently. If weeks or possibly months of pain and disability are to be avoided, it is essential for those undertaking the treatment of gonorrhœa to recognise that a past history of gonorrhœal rheumatism should be the signal for the most energetic treatment possible, and that the usual two doses of penicillin 125,000 units, with or without sulphonamides, often prove insufficient in these cases.

Belmont Road Emergency Hospital, Liverpool, 6. C. D. ALERGANT.

THE CHRONIC SICK

SIR,—Much discussion has been expended on geriatrics and on what would be the ideal provision for the aged, who of course constitute the main source of chronic invalids. But when will anything else be expended? Professor Ferguson's most interesting article in your issue of March 13 shows how much can even now be done in the patient's own home. But, even so, the pressure on acute hospitals for chronic sick admissions is not likely to be diminished, and the question is urgent now. Is it really the shortage of accommodation which is the difficulty when so many E.M.S. hutted hospitals were erected during the war? The difficulty is surely lack of nurses; but these untreatable chronics do not really require nurses: they require only that care and attention which the untrained relatives were able to give in days when there was more room in homes. I suggest that segregation of chronic sick patients in existing cottage hospitals (which are seldom equipped or staffed for modern diagnostic or operative procedures, but which are admirably placed for visitation by friends) and in E.M.S. hutted hospitals would solve many problems, provided we also made up our minds that staffing by ward orderlies was all that could or need be arranged.

Heswall, Cheshire. DAVID WILKIE.

Public Health

World Control of Tuberculosis

"There can be no isolationism in the field of health. The fight against infectious disease is not a national or racial problem; it is a task for the whole of humanity. . . . The all-inclusive objective of any sound tuberculosis programme is the prevention and eventual eradication of tuberculosis from the peoples of the world."

The expert committee on tuberculosis, appointed by the interim commission of the World Health Organisation (WHO) in 1947, set out their problem in these words in the report [1] of their first session.

The committee is composed of Dr. Johannes Holm of the State Serum Institute, Copenhagen (chairman), Dr. Herman Hilleboe, United States Public Health Service, and Dr. P. D'Arcy Hart, Medical Research Council, London. Dr. J. B. McDougall, as secretary, and Dr. W. Gellner, of the field services of the interim commission, also attended.

There are five fields, the committee agreed, in which planned work must be done if we are to eliminate tuberculosis—namely, prevention, case-finding, isolation and medical care, reablement and aftercare, and the social and economic protection of afflicted families. They also suggest eleven principal techniques essential for tuberculosis control. First, the extent of the tuberculosis problem in each country, and the means which have been developed for tackling it, must be assessed. Schedules are being prepared on which basic data of this kind can be recorded. Recruitment and training of personnel must be encouraged by the award of, say, a thousand travelling fellowships over the next few years to medical officers in the countries most in need of expert staff. Equipment and supplies for all phases of prevention, diagnosis, and treatment must also be acquired; the committee suggest that WHO should advise on what is needed, and on the best means of financing schemes to provide and maintain buildings and equipment. Voluntary organisations should be encouraged to undertake education of the general public in tuberculosis control and prevention. Teams are needed, too, to demonstrate practical work in epidemiology, administration, and laboratory and clinical methods; and the countries to which, on request, such teams are sent should afterwards take over the centres used for demonstration as national training centres. When it becomes possible, money grants for the control of tuberculosis might be made to needy countries. WHO can also contribute to research by providing small subcommittees of experts to advise on highly specialised fields, and by recommending uniform procedures in work on tuberculin and tuberculin-testing, the preparation and clinical use of B.C.G., the classification of tuberculosis, X-ray interpretation and mass radiography, laboratory diagnosis of tubercle bacilli, and the evaluation of new chemotherapeutic agents such as streptomycin. They recommend that WHO should establish working relationships with all international organisations interested in tuberculosis control, should use its influence to encourage nations to eradicate tuberculosis in cattle, and should give expert advice to governments and health departments on sound laws and regulations relating to human and bovine tuberculosis. Finally they consider that WHO should yearly review and evaluate its public-health programme with the advice and counsel of the expert committee.

Since tuberculosis has reached epidemic proportions in some countries they propose that certain emergency measures, costing little, should be applied at once. These include the sending of small demonstration teams to such countries, to carry on intensive programmes of B.C.G. vaccination similar to those conducted by the Danish Red Cross. A permanent Tuberculosis Control Office should be established, they think, within WHO.

As a preliminary programme these proposals seem sound and promising; but the committee have not yet broached the problem which, left unsolved, may wreck all plans—that of providing nursing staff for the care of the tuberculous.

1. *Bull. World Hlth Org.* 1948, 1, 205.

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Publicity for the Service

The Minister of Health, in a circular (36/48), urges local authorities to meet the expected demand from the public for detailed information about the services to be provided by them under part 3 of the National Health Service Act. It is suggested that health committees should consider how, just before and after the appointed day, they may publicise these services by interviews with representatives of local newspapers, by speeches to interested groups, and by reports of discussions. An authoritative guide to the local authority's services should be prepared and revised from time to time. The circular points out that inquiries at the offices of local health authorities will no doubt include some relating to the general-practitioner and hospital services; and the bodies responsible for these services are being asked to supply local authorities with relevant local information. In some areas joint inquiry bureaux may be desirable.

Parliament

FROM THE PRESS GALLERY

Employment of Disabled Persons

REPLYING to an adjournment debate in the House of Commons on March 15, Mr. G. A. ISAACS, Minister of Labour, said that the Disabled Persons (Employment) Act embodied a pledge to disabled persons that they would be cared for. At the moment there were difficulties in the way, and he was not satisfied that we were going as fast as we should. Outlining what had been done, he said that between January, 1945, and December, 1947, at the vocational training centres 10,000 disabled had been successfully trained. Over 3400 were under training at present. In South Wales the Government were building factories which were being lent to employers on condition that they employed a certain proportion of silicotics. It was easy to build a factory in an area where a group of people suffered from the same disease, but in another area, where there was a heavy number of unemployed suffering from all sorts of diseases, it was not so easy. At present 16 Remploys were in operation, employing 800 people. But the Disabled Persons Employment Corporation had set their target at 107 factories employing 10,000 people. It was hoped to open 29 more factories this summer, if building materials and equipment were available, and to get 50 factories in operation by the end of this year, employing some 4000 persons. That still left a potential 6000 people behind, but the difficult circumstances of the times must be taken into account.

QUESTION TIME

Hospitals and the National Health Service

Mr. HUGH LINSTEAD asked the Minister of Health approximately how many hospitals had not yet been told whether or not they were to be taken over by the Minister on July 5; and whether he would say by what date they would all be informed.—Mr. A. BEVAN replied: I have advised all hospitals which appear to me liable to be taken over. I am now deciding, with the help of the regional boards, which hospitals it would be proper to disclaim.

Nutrition in Germany

Mr. SOMERVILLE HASTINGS asked the Secretary of State for Foreign Affairs what were the most recent findings of visiting teams of experts on the nutritional state of the people living in the western zones of Germany.

Mr. C. P. MAYHEW replied: Late last autumn the members of the Combined Nutrition Committee reported that the state of nutrition of the urban population in the western zones of Germany had improved during the previous six months, though this does not, of course, mean that the standard is in the least satisfactory. Famine œdema was stated to be very rare and adult body-weights had not declined. The findings of the Combined Nutrition Committee have been confirmed by a survey of representatives of the Medical Research Council carried out in November last.

Mr. HASTINGS: Will the result of the survey carried out by members of the Medical Research Council be published?—Mr. MAYHEW: The survey was made for the personal guidance of the commander-in-chief and there is no intention of publishing it. Mr. HASTINGS: Would it not be of great interest to the public, in view of the disquieting statements that are received from many directions about the nutritional state of Germany?—Mr. MAYHEW: I am not sure that the report is suitably produced and in a suitable form for publication.

Panel Lists

Mr. B. T. PARKIN asked the Minister of Health if names on existing panel lists would automatically remain on the list of their present doctor if he entered the National Health Service before the appointed day, subject to the customary 14 days' opportunity to change if they wish.—Mr. BEVAN replied: The names will be automatically transferred to the doctor's list under the new scheme unless either the doctor or the patient objects.

Superannuation

Mr. PARKIN asked the Minister if he would give an assurance that doctors joining the National Health Service in July who had not reached their 56th birthday would be eligible to complete 10 years' service and qualify for superannuation and retirement allowance.—Mr. BEVAN replied: Yes.

Medical Students

Dr. SANTO JEGER asked the Secretary to the Treasury whether he would state the number of medical students at present studying at medical schools.—Mr. GLENVIL HALL replied: 13,300 at the beginning of the academic year 1947–48.

Food Subsidies

Mr. R. H. TURTON asked the Minister of Food what was the estimated amount that would be paid in subsidies on food and feeding-stuffs during the current financial year, and of that total how much would be spent in respect of imported supplies and how much in respect of home-produced supplies.—Dr. EDITH SUMMERSKILL replied: The total amount to be spent on food subsidies, including animal feeding-stuffs, welfare schemes, acreage payments, and fertiliser subsidies, during the year to March 31, 1948, is now estimated at £395·3 million. Of this sum £189·6 million is in respect of home-produced supplies and £205·7 million is in respect of imported supplies.

Diary of the Week

MARCH 28 TO APRIL 3

Tuesday, 30th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. R. M. Handfield-Jones: Less Usual Examples of Acute Intestinal Obstruction.

Wednesday, 31st

ROYAL COLLEGE OF SURGEONS
5 P.M. Prof. G. Grey Turner: Surgery of the Spleen.

Thursday, 1st

ROYAL COLLEGE OF SURGEONS
5 P.M. Sir Heneage Ogilvie: Scrotal Swellings.

Friday, 2nd

ROYAL COLLEGE OF SURGEONS
5 P.M. Prof. Warren H. Cole (Chicago): Repair of Strictures of the Common Bile-duct. (Moynihan lecture.)
LEEDS AND WEST RIDING MEDICO-CHIRURGICAL SOCIETY
8.30 P.M. Dr. T. Main: Some Diseases of People.

Appointments

ALLEN, LETITIA, M.B. Belf., D.P.H.: senior asst. county M.O. for mental health services, Kent.
ANDERSON, H. F., M.A., M.B. Camb., F.R.C.S.: asst. surgeon, St. George's Hospital.
DAVIDSON, JOSEPHINE, M.B. Edin., M.R.C.O.G.: asst. gynæcologist and obstetrician, Cumberland Infirmary, Carlisle.
DAVIES, S. W. V., B.SC., M.B. Wales: asst. medical director of mass-radiography unit and asst. tuberculosis officer, Warwickshire and Coventry.
GORDON, ISABELLA, M.B. Aberd., D.P.H.: maternity and child-welfare officer, Somerset.
HAMILTON, H. C., M.B. Lond.: medical first assistant, London Hospital.
HOWKINS, JOHN, M.S., M.D. Lond., F.R.C.S., F.R.C.O.G.: gynæcologist, Royal Masonic Hospital, London.

Hospital for Consumption and Diseases of the Chest, Brompton:
WHYTEHEAD, L. L., B.M. Oxfd, F.R.C.S.: chief surgical assistant.
WOOD, P. H., O.B.E., M.D. Melb., F.R.C.P.: physician to cardiac department.

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Notes and News

NORDISK MEDICIN

OUR weekly Scandinavian contemporary *Nordisk Medicin* is a conglomerate body, in which are fused all but one of the leading Scandinavian medical publications. Hitherto each country has had its own allotted share of space, with the result that this journal has presented the appearance of a Swiss roll on section. Undoubtedly the journal made good in this form, not least abroad where students of Scandinavian medicine were able to find most of what they sought under one and the same cover. But it was felt in the Scandinavian countries themselves that their resources could be better pooled if the Swiss roll were less definitely stratified in a national sense. It was argued that by thinking in terms of medicine as an international science, and by ignoring geographical and racial boundaries as much as possible, the editors might achieve a more homogeneous unit. Many other changes were suggested and discussed, with the result that *Nordisk Medicin* (which had hitherto been published as *Nordisk Medisin*) began to come out at the beginning of this year in a much revised form. An editorial notice in the last number of 1947 says:

> "A much-wished-for innovation will be short leading editorials, observanda, and short articles of the same type as *The Lancet*'s annotations, dealing with the most recent news in the medical world and drawing attention to problems which have recently turned up, methods, preparations, or the like."

The total number of articles, big and small, has been greatly increased, and the necessary space for them has been provided by stern subediting. Several of the first eight numbers this year give evidence of centralised editing, with many articles on the same subject contributed from different points of view by various writers. For example, in no. 8 (Feb. 20) there are half a score of original articles on various aspects of Graves's disease; and in the same number there is an editorial on the treatment of thyrotoxicosis and an annotation on the use and misuse of thyroid preparations.

Why, it may be asked, does Scandinavian medicine stand so high today? May not the answer be found to some extent in the linguistic versatility of the Scandinavians? For while the English-, French-, and German-speaking doctor is tempted by the wealth of knowledge at home to remain unilingual (and by the same token a trifle unimental) his Scandinavian colleague widens his field of vision by looking out of many different windows.

THE PLACE OF THE ALMONER

As a social worker in a medical setting the almoner deals with social problems associated with sickness and recovery. A good idea of the scope of her work is given in a small volume,[1] lately published by the Institute of Almoners. As Prof. Alan Moncrieff, chairman of the council of the institute, points out in his foreword, medical social work has moved away from the negative conception of prevention of the abuse of a hospital's charity, to a positive conception in which the almoner contributes to the diagnosis and treatment of disease by providing the doctor with the social background against which the patient's symptoms must be judged.

That is her service to the doctor; but her services to the patient are manifold. They extend, as this little book shows, from arranging transport to hospital for a one-legged patient in a remote country village, to sending particulars to a farmer about an underground pipe on his land, because the anxious ploughman, in hospital, feared that his understudy might unwittingly break a ploughshare. Such emergency situations are interlaced with long-term problems, which compel the almoner to have a wide knowledge not only of such things as convalescent homes and reablement centres but of the industries in her region and the opportunities they offer to a disabled man or woman. She may have to advise a skilled mechanic who has lost his right hand in an accident, a boy whose heart has been permanently damaged by rheumatic fever, the patient who is aphasic after a head injury, or the housewife with failing sight; and to guide her she has the fundamental principle on which the work of almoners is founded: to help these people, "through the best use of their own capabilities, and through the resources of the community," to overcome their difficulties and achieve the fullest possible measure of health and independence. The book describes the almoner's work in various fields—in hospitals and clinics for tuberculosis and venereal disease, in reablement centres, among children—and in the new field of social research. A last chapter shows that not all hospital boards have as yet begun to value the almoner in her true capacity: some still fancy she exists to protect the hospital from exploitation by those who could afford to pay for treatment. It is disappointing to learn that had they had "the general support of the medical profession much more could have been achieved and much faster."

Actually the abuse of hospital services is trivial, as almoners have been able to show. Another form of abuse, however, not consciously discussed in this booklet, cannot fail to strike the reader. It is remarkable how often, even among the relatively few cases quoted here, delays by Government departments and other bodies deprived patients of necessary funds or other promised aid at the times when these things were needed and expected. Here are examples:

> "A long delay in securing the grant" (a Ministry of Labour grant for training under the Rehabilitation Scheme) "complicated the arrangements, and the almoner had to advance money through her Care Committee to avert financial catastrophe. . . ."
>
> "There were administrative difficulties over the maintenance allowance. . . ."
>
> "After a period of financial distress his Blind Pension came through. . . ."
>
> "The facilities offered by the Ministry of Labour provided the means for training and financial support during the training period . . . when, owing to a misunderstanding, the application was refused. . . ."

To a patient in low financial water owing to illness, these delays add greatly to anxiety and mental strain.

CONGRESS ON INDUSTRIAL MEDICINE

THE Commission Internationale Permanente pour la Médecine du Travail was founded in Milan in 1906, with Prof. L. Devoto as the first president, and Prof. L. Carozzi, who still holds the office, as hon. secretary-general. Since then it has held eight congresses in different European countries. The last was held at Frankfort in 1938, and the ninth, to be held this year in London, is the first to take place in Great Britain. The congress will meet at the Caxton Hall, Westminster, S.W.1, from Sept. 13 to 17, and its work has been divided among six sections. The discussions of the section on social aspects, under the chairmanship of Prof. T. Ferguson, will include work and skill, young persons in industry, and incentives. The section on environment, of which Prof. E. C. Dodds, F.R.S., is chairman, will consider the nature of dust, and architecture. The clinical section, with Prof. R. E. Lane as chairman, will hear papers on diseases of the lungs, the newer chemicals and metals, and chemical and thermal burns. The section on practice, under Dr. A. J. Amor's chairmanship, will review the organisation of medical services and the hazards and aspects of specific industries. Dr. E. R. A. Merewether is chairman of the special section, whose discussions will range over industrial legislation, the training of the industrial medical officer, and radiant energy. There will also be a section on nursing. Rehabilitation will be dealt with separately in the Mackenzie (B.M.A.) lecture, and in lecture-demonstrations at the London Hospital and other institutions. Delegates will be able to visit rehabilitation centres, clinics and hospitals, and exhibitions inside and outside London. Lord Moran and Sir Alfred Webb-Johnson are presidents of the congress, Mr. T. E. A. Stowell is chairman of the British organising council, and Dr. Donald Hunter of the planning committee. The honorary medical secretary is Dr. H. J. Davies, and the office of the congress is room 501, Garden Court Wing, B.M.A. House, Tavistock Square, W.C.1.

THE LITTLE SCHOOL AT SUVA

"SUCH a tiny little school," a lady once said to the late Dr. S. M. Lambert about the Central Medical School at Suva. He did not tell her that, when she saw it, the school had cost him and many others 17 years of ambitious planning; and that it was already becoming what it has since proved—the means of saving and revivifying more than one dying race in the Pacific.

When the Rockefeller Foundation sent Dr. Lambert out there in 1920, to do some research on hookworm, the old Fiji Medical School had been established for over 30 years. It was founded in the '80s—a few years after Fiji became a British colony—to train native practitioners and vaccinators. These worked for three years as dressers in a public hospital, passed an examination in medicine and surgery, and were

1. The Almoner. London: The Institute of Almoners, Tavistock House North, Tavistock Square, W.C.1. 1948. Pp. 66. 3s. 6d.

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then appointed to practise medicine in districts chosen by the chief medical officer. Their services were given to the people gratis, and they were paid a very small salary by the Government and the province between them—£7 10*s.* a year, to be exact.

Dr. Lambert, in the early years of his adventurous life in the Pacific, described so brilliantly in *A Doctor in Paradise*,[1] quickly saw how such a scheme could be fostered, and how it might in time be the means of saving the islanders from the ills the white traders and colonists had brought them. In his long struggle to create a new school he worked with Dr. Aubrey Montague, the chief medical officer from 1919 to 1930, and many other administrators in the islands and in the New Zealand, British, and Australian governments, as well as local princes and chiefs. He had to persuade the Rockefeller Foundation to bear some of the cost, and with the opening of the Colonial War Memorial Hospital at Suva in 1923 the arguments became more cogent; for the medical superintendent needed assistants. The old school was a school in name only, for there were no buildings, no pre-medical course, and only part-time teachers. None the less, it had trained 138 native medical practitioners in its time, 55 of whom were in practice, and one of whom—Malakai Veisamasama—was Lambert's right hand on all his strange travels to fierce or friendly islands.

In the end the grant was made, six island groups gave their quota, and the school was opened in 1928, with 40 students—20 from Fiji, 4 each from Tonga, Gilbert and Ellice Islands, the British Solomons, and Western Samoa, and 2 each from the Cook Islands and the New Hebrides. The students live in well-built quarters and take a soundly planned four-year course, in English. There is a staff of honorary lecturers, and Dr. D. W. Hoodless, the principal, holds a full-time appointment; in a small booklet [2] he tells how well the school has prospered since its founding.

Lambert had two other ambitions besides the school: he wanted a first-class leper colony established at Mokogai, and a unified medical service for the South Pacific. The first he lived to see, and the second, as Dr. Hoodless tells, was fulfilled in 1946 when the South Pacific Health Service came into being. Moreover, Australia, which disappointed Lambert by refusing to send Papuans to the school—saying they were too backward—applied last year for the admission of Papuan students. Lambert had "worked in the Jungle with Papuan and New Guinea boys": he did not find them backward; and indeed his whole book breathes confidence in the good brains and dependability of the South Pacific peoples, as well as affection for their charming manners and their kindness.

PUBLIC OPINION OF THE ACT

THE results of a Gallup poll on the National Health Service, conducted by the British Institute of Public Opinion, were published in the *News Chronicle* on March 18. To the question whether the service was considered a good or a bad thing, 61% replied "good," 13% "bad," 7% "neither," and 19% "don't know." Men were more in favour of the service than were women. Among the well-to-do those with definite opinions were by only a slight margin in favour of the service; that this attitude was determined by income rather than by political affiliation is shown by the fact that of Conservatives with definite views two supported the service for every one opposing it. Among supporters of the Labour Party, however, 75% looked forward to the service and only 4% were opposed to it. Of the 64% who said they had some idea what the dispute between the Minister of Health and the British Medical Association was about, 30% said their sympathies were with doctors and 28% against doctors, while 6% said "don't know." The poorest group was mainly against the doctors; but among the well-to-do there was a four-to-one majority supporting the stand of the B.M.A.

Congress of Climatology

The Italian Association of Hydrology, Climatology, and Thalassology is holding an International congress at Riccione on June 12 and 13. Those taking part will include Prof. Alvar Gjertz (Stockholm), Prof. Jose de San Roman Y Rouyer (Madrid), Prof. F. Scheminsky (Innsbruck), and Prof. K. M. Walthard (Geneva). Further particulars may be had from Dr. Antonia Stern, 71 via M. Macchi, Milan.

1. London, 1942.
2. Central Medical School. Prepared for the Medical Department by the Public Relations Office, Fiji, and printed at the Government Press, Suva. Pp. 23.

Royal College of Surgeons of England

Prof. Warren H. Cole, who holds the chair of surgery in the University of Illinois, is to deliver a Moynihan lecture at the college on Friday, April 2, at 5 P.M. He is to speak on Repair of Strictures of the Common Bile-duct.

A course of lectures in anæsthesia is to be held at the college from April 5 to 20 at 6.15 P.M. Further particulars will be found in our advertisement columns next week.

Chesterfield Medal

The examination for this medal will be held at St. John's Hospital for Diseases of the Skin, 5, Lisle Street, London, W.C.2, on Wednesday and Thursday, April 7 and 8, and Friday, April 16.

Manchester Regional Hospital Board

Dr. F. J. Harvey and Dr. J. S. B. Mackay have been appointed assistant senior medical officers to the board. A third assistant senior medical officer, with special experience in mental health work, is to be appointed.

Atomic-energy Research

At its meeting last Tuesday the London County Council received a proposal for extensions at Hammersmith Hospital, to be used by the Medical Research Council for atomic-energy research.

London Consultants' Liaison Committee

The first meeting of this committee was held on March 16, when representatives were present from the London teaching hospitals, the Association of non-Teaching Hospitals, the Association of Municipal Specialists, and the consultants' and specialists' standing committee and Marylebone division of the B.M.A. Lord Horder was elected chairman, Sir Reginald Watson-Jones vice-chairman, and Mr. Eric Steeler secretary. The following terms of reference, laid down by the B.M.A. council's letter of Feb. 20, were adopted:

> To establish and maintain liaison between the consultants and specialists staffs of the London Hospitals and with the B.M.A. in order to unify and consolidate consultant and specialist opinion on the National Health Service Act, 1946, within the policy of the profession as a whole.

The following resolution was passed unanimously:

> That the committee considers it desirable to investigate the present Act with respect to the privileges and restrictions of the consultant and specialist section of the profession, and that the best possible legal opinion be obtained to that end.

CORRIGENDUM.—The first author of the note on Streptomycin in Human Plague, which appeared in our issue of Jan. 3 (p. 22), should have been given as Lieut.-Colonel P. V. Karamchandani.

Births, Marriages, and Deaths

BIRTHS

CLEGG.—On March 10, at Horsham, the wife of Dr. John Clegg—a daughter.
COLYER.—On March 15, the wife of Dr. Peter Colyer—a daughter.
HOWKINS.—On March 14, at Wimbledon, the wife of Mr. John Howkins, F.R.C.S.—a daughter.
LEWIS.—On March 15, at Bude, the wife of Dr. Walter Lewis—a son.
MORGAN.—On March 13, at Carshalton, the wife of Surgeon Lieut.-Commander J. T. Morgan, R.N.—a son.
PARKER-WOOD.—On Feb. 11, in Cape Town, the wife of Dr. B. F. H. Parker-Wood—a daughter.
ROPER.—On March 12, in London, the wife of Dr. Anthony Roper—a son.
TURNER.—On March 16, in London, the wife of Dr. R. S. Turner—a daughter.
WILLIAMS.—On March 13, the wife of Mr. D. I. Williams, F.R.C.S.—a son.
WISE.—On March 10, the wife of Dr. C. R. Wise—a son.

MARRIAGES

ARNOTT—BURT.—On Feb. 21, in London, David Charles Arnott, M.B., to Ruth Margaret Burt, M.R.C.S.
HYNES—CHARLTON.—On March 13, in Nottingham, Martin Hynes, M.D., to May Charlton.

DEATHS

HAY.—On March 12, in London, Malcolm Bell Hay, M.R.C.S., D.P.H.
MELLER.—On March 16, at Felixstowe, Robert William Meller, M.R.C.S., D.P.H.
MOORE.—On March 16, at Henbury, Glos, Clifford Arthur Moore, M.S. Lond., F.R.C.S.
NORMAN.—On March 13, in London, Hubert James Norman, M.B. Edin., D.P.H., aged 67.
POTTS.—On March 13, at Maidstone, George Potts, F.R.C.S., aged 71.
SMITH.—On March 12, in Glasgow, Angus Dalrymple Smith, M.B. Edin., F.R.C.S.E., aged 47.
YOUNG.—On March 12, in Glasgow, Roy Frew Young, M.C., B.A., M.B. Camb., F.R.F.P.S., LL.D.

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MEASURED RADICAL GASTRECTOMY *

REVIEW OF 505 OPERATIONS FOR PEPTIC ULCER

A. HEDLEY VISICK
M.B. Lond., F.R.C.S.
SURGEON, YORK COUNTY HOSPITAL; VISITING SURGEON, YORK CITY GENERAL HOSPITAL

To discover the limitations and advantages of a Polya-type gastrectomy, a consecutive series of 500 patients have been followed up at regular six-monthly intervals since operation. This series includes all patients with peptic ulcer on whom I operated in 1936–47. Those dealt with by emergency gastrectomy for acute hæmorrhage or for acute perforation are not included.

Since other operations, such as vagotomy and vascular ligation, have been introduced, this series may form a useful basis for comparison of results. The day of judging results by impression is past, and it is only by carefully following up all patients and assessing their condition by an independent tribunal that we can gain a true picture of the effectiveness of any procedure.

The usual indication for operation was severe pain unrelieved by medical treatment. Repeated hæmorrhage, repeated perforation, and suspicion of malignancy were responsible for relatively few operations.

Shortage of beds has prevented us from giving adequate preliminary medical treatment to all patients. If there is evidence of chronic penetrating ulcer, or of organic deformity of the stomach or the duodenum, or if there is a long history of repeated relapses, preliminary medical treatment is not insisted on. Few patients of hospital class can afford the time and expense involved in long-continued treatment; and, if symptoms are incapacitating, I find it difficult to urge them to submit to the risks and disappointments of medical treatment, since surgery can produce so much better results with greater safety.

The ulcers in the present series were distributed as follows:

Type of Ulcer	*Male*	*Female*	*Total*
Duodenal	322	35	357
Gastric	47	21	68
Combined	38	7	45
Secondary	32	3	35
Total ..	439	66	505*

* 5 of our own patients developed a secondary ulcer, and are quoted twice.

The over-all ratio of males to females was 6·6 : 1. The relative proportion of males varied according to the site of the ulcer. For gastric ulcer (G.U.) it was 2 : 1, duodenal ulcer (D.U.) 9·2 : 1, combined gastric and duodenal ulcer (G.D.U.) 5·4 : 1, and secondary ulcer (S.U.) 10 : 1.

The over-all ratio of D.U. to G.U. was 3·6 : 1 (males 4·2 : 1, females 1·5 : 1).

There were 113 G.U., of which 45 were associated with D.U.; 402 D.U., of which 45 were associated with G.U. Combined G.D.U. formed 9% of the total series; usually either the G.U. or the D.U. was inactive, but on several occasions both ulcers were active and penetrating deeply into surrounding viscera.

Of the 35 S.U., 29 followed a gastro-enterostomy and 6 a gastrectomy. Only 3 S.U. occurred in women.

These 505 ulcers were dealt with by 505 gastrectomies in 500 patients, a second gastrectomy being necessary in 5 of our own patients.

No special tendency was shown to give those with gastric ulcer preferential admission, for we feel that a man's need for urgent relief does not depend on the site of his ulcer but on the severity of his symptoms.

The age-group with the highest number of patients was 40–49. The peak incidences of G.U. and of G.D.U. were a decade later (see table I).

* Based on a lecture delivered to the York Medical Society, the Halifax and Derby branches of the B.M.A., and the Leeds Medico-Chirurgical Society.

All these patients, whether with G.U., D.U., or S.U., were treated by exactly the same type of gastrectomy, which varied only in the extent of resection. We felt that we could only assess the value of this operation if a reasonably large and consecutive series of patients was analysed. Gastro-enterostomy was reserved for those aged over 60 who were very bad surgical risks, and is excluded from this survey.

MEASURED RADICAL GASTRECTOMY

The terms gastrectomy, partial gastrectomy, and subtotal gastrectomy have no exact anatomical significance, and it is only by watching a surgeon that one can appreciate his interpretation of these operations. Most surgeons state that they remove either "half to two-thirds," or "two-thirds to three-quarters" of the stomach, but I feel that the size of the part which remains is more important than the proportion of stomach removed.

In practice it is impossible to measure accurately the size of so irregular an organ as the stomach. Therefore, instead of making what is inevitably a vague guess at the proportion of stomach which we intend to remove,

TABLE I—INCIDENCE AND TYPE OF ULCER IN RELATION TO AGE

Age (years)	10–19	20–29	30–39	40–49	50–59	60–69	70+	Total
D.U. ..	4	35	104	141	60	13	0	357
G.U. ..	0	0	10	21	22	13	2	68
G.D.U. ..	0	0	13	14	17	1	0	45
S.U. ..	0	1	8	17	7	2	0	35
Total ..	4	36	135	193	106	29	2	505

we have concentrated on measuring the exact size of the part left in situ.

Fig. 1 indicates the different levels at which most surgeons divide the stomach. The relation of each level to the blood-supply should be noted. The line C is the level of "half to two-thirds" resection, the greater curvature being divided at the level of the junction of the left and right gastro-epiploic arteries. In this operation most of the branches of the left gastro-epiploic arteries are left intact. The line B is the level of "two-thirds to three-quarters" resection, the greater curvature being divided at the level of the gastrosplenic omentum, involving division of all branches of the left gastro-epiploic artery but leaving the vasa brevia intact. In a two-thirds resection one or more branches of the left gastro-epiploic artery escape division (fig. 2*a*).

The line A indicates the approximate line of resection which we have adopted as a routine for measured radical gastrectomy. All the vessels of the greater curvature are divided, except the highest one of the vasa brevia (fig. 2*b*). In cases of secondary or recurrent ulcer, or in patients considered specially liable to recurrent ulcer, all the vasa brevia are divided. The gastric artery is divided close to the pancreas, and the duodenum is cut distal to the ulcer when possible. The line of section of the stomach is made so as to leave a small devascularised remnant 1½ in. along the lesser curvature and 3 in. along the greater curvature. A 4-in. antecolic jejunal loop is attached to the lesser curvature, and the anastomosis retracts under the ribs well clear of the left paramedian incision.

This operation makes it possible to remove a surprisingly extensive area of stomach. Division of the vasa brevia mobilises the fundus, and the point A falls away from the spleen and presents in the wound (fig. 2*b*). In the three-quarters resection that point remains high under the dome of the diaphragm anchored against the spleen (fig. 2*a*).

O

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As each vessel passing to the greater curvature is divided, the stomach changes shape. It contracts in width, increases in length, and becomes more tubular. Division of the vasa brevia allows 4–6 in. of additional greater curvature and fundus to be resected without undue tension on the stomach; and, provided the chest is not deep and barrel-shaped, the anastomosis can be effected outside the abdomen. In most cases the stoma measures 3 in. long.

The measured radical gastrectomy differs from a conventional three-quarters gastrectomy in three respects: the area of stomach which remains can be measured and controlled with accuracy; the gastric remnant is extensively devascularised; and in 98% of cases permanent achlorhydria results.

The permanent elimination of free acid has been the primary aim of the operation; the removal of the ulcer is incidental. In cases where the D.U. is considered irremovable the stomach may be divided through the antrum proximal to the ulcer without fear of recurrence. Provided that the gastric remnant measures no more than $1^1/_2$ in. and 3 in. along the lesser and greater curvatures respectively, there is no need to remove all the pyloric mucosa, nor is it necessary to reopen the abdomen in a few weeks to remove the pyloric segment; for, in view of the wide resection and extensive devascularisation, hormonal activity of the antrum and pylorus will be unable to stimulate sufficient acid secretion to cause recurrent ulcer formation. In this series there were 12 patients with irremovable D.U., and not one has complained of pain since operation.

The results of measured radical gastrectomy provide the basis for our contention that the protection against recurrent ulcer provided by gastrectomy is inversely proportional to the area of stomach left in situ and to the integrity of its blood-supply.

During the last ten years many minor modifications of technique have been introduced, but the operation I perform today differs in one important respect only from the operation as originally planned—it has become more radical. This series of 505 gastrectomies can be

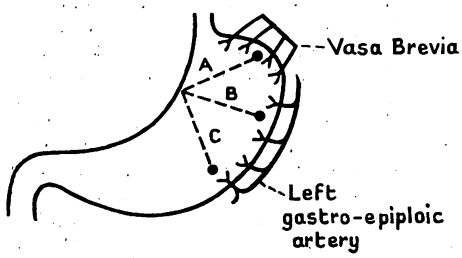

Fig. 1—Levels of section in different types of gastrectomy in relation to blood-supply: A, measured radical gastrectomy; B, "two-thirds to three-quarters" gastrectomy; C, "half to two-thirds" gastrectomy.

divided into three phases corresponding to the extent of resection undertaken during the period:

Phase I (cases 1–150).—A conventional "two-thirds to three-quarters" resection, the proportion of stomach removed being determined by "estimation"—i.e., guess-work.

Phase II (cases 151–300).—A resection which varied from three-quarters to nine-tenths, and in later cases a measured radical gastrectomy. During this phase the extent of gastrectomy was gradually increased, the more radical removals being reserved for those patients considered especially liable to recurrence.

Phase III (cases 301–505).—A measured radical gastrectomy performed on all patients with duodenal ulcer irrespective of history, type of ulcer, or estimated liability to recurrence. Only those with G.U. were dealt with less radically.

Phase I.—Among the first 150 cases of two-thirds to three-quarters resection there were 5 patients who developed recurrent ulcer within eighteen months of operation (table II). It was obvious that a resection of this degree gave but limited protection against recurrent ulcer.

There were two findings common to every case of recurrent ulcer: the postoperative acid level was (with one exception) high normal; and, whatever the estimated level of resection may have been, the primary branch of the left gastro-epiploic artery and all vasa brevia were found to be still intact.

Each of these patients was treated by a further secondary gastrectomy, which produced achlorhydria and relief from pain.

Phase II.—In the second series of 150 gastrectomies the operation was modified to deal with these two points. The line of gastric section was advanced towards the cardia, and a gradually increasing amount of stomach was removed, varying from three-quarters to nine-tenths (by guess). Finally, in later cases by exact measurement, a remnant was left measuring $1^1/_2$ in. and 3 in.

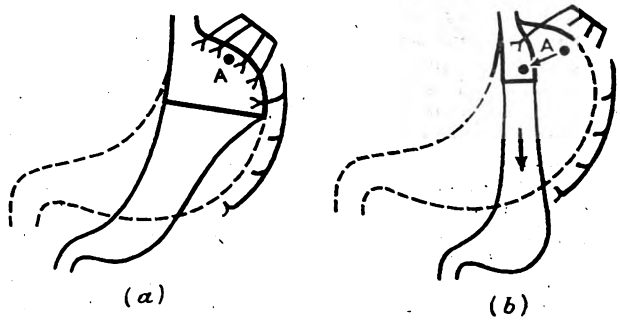

Fig. 2—Effect of division of blood-vessels supplying stomach: (a) in "two-thirds to three-quarters" gastrectomy point A remains anchored against hilum of spleen; (b) in measured radical gastrectomy, after division of vasa brevia, point A falls away from spleen and presents in wound. Note change in shape of stomach after division of blood-vessels.

along the lesser and greater curvatures respectively. In all cases every branch of the left gastro-epiploic artery was divided, and for the patients in later groups all but one of the vasa brevia were also divided.

This operation has so far given complete protection against recurrence, but the effectiveness of this protection depends on the judgment of the surgeon selecting the right cases for the more radical removal. It is the routine minimum, not the occasional maximum, of stomach removed in all cases which determines the recurrence-rate.

Phase III.—In the last 205 cases, therefore, the measured radical gastrectomy was done as a routine for all D.U., leaving a remnant measuring $1^1/_2$ in. and 3 in. along the lesser and greater curvatures respectively. For G.U. a less extensive resection is needed, since experience shows that S.U. following gastrectomy for G.U. is almost unknown. For these cases the gastric remnant measures 2 in. and 5 in. along the lesser and greater curvatures respectively.

SELECTION OF PATIENTS LIABLE TO RECURRENCE

It is well known that all patients do not tend alike to recurrent ulceration. Men who have had multiple acute perforations, men who have had S.U. after gastro-enterostomy, and young men with rapidly emptying stomachs and high acidity have a special tendency to ulcer formation. For these patients a very radical gastrectomy is needed, and it would be a simple matter to arrange for this if recurrent ulcer were confined to those groups. Unfortunately this is not so.

It is commonly stated that ulcer very rarely recurs in women; nevertheless 3 of the 35 S.U. in the series were in women.

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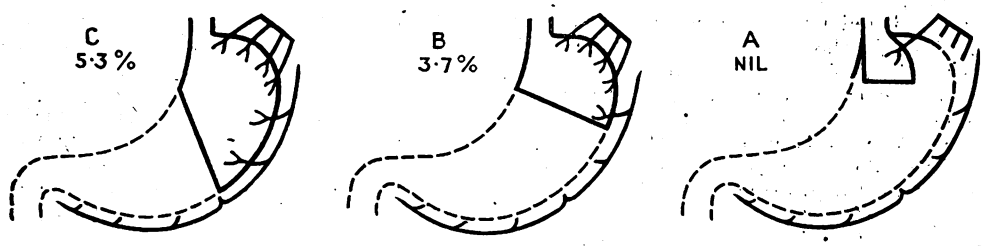

Fig. 3—Incidence of recurrent ulcer in relation to extent of gastrectomy and blood-supply of gastric remnant: A, measured radical gastrectomy; B, "two-thirds to three-quarters" gastrectomy; C, "half to two-thirds" gastrectomy. Recurrence-rate for C is based on the report of Heuer et al.[2] on three-month to ten-year results; it would be considerably higher if the later cases were excluded and the recurrence-rate calculated only on the two-year results as in B (present series).

Walton [1] has tried to select patients specially liable to recurrence by the degree of mucosal folding seen by gastroscopy. This can be confirmed by noting the size and thickness of the stomach at operation. I have made a special practice of examining the stomachs which I have removed because of recurrent ulcer; and, though some of these show abnormally extensive mucosal folds, this finding is by no means constant.

The preoperative acid level is equally unreliable. Though most patients with recurrent ulcers have hyperacidity, a primary gastrectomy which has produced achlorhydria does not ensure freedom from recurrence; but ulceration in the presence of achlorhydria is very rare. Only 1 of 35 S.U. in this series was associated with achlorhydria (in a woman on whom I had done a three-quarters resection for D.U. two years previously).

Though the history, pathological findings, and gastroscopy may indicate the need for a specially extensive resection for certain patients, the danger of recurrence will remain unless a sufficiently radical removal is done as a routine, for as yet we have no absolutely reliable method of selecting those who are specially liable to recurrence. A limited resection is little better than a gastro-enterostomy, and we feel it is better to remove what seems to be too much stomach in many patients lest a few be exposed to the danger of recurrence.

RECURRENCES AFTER GASTRECTOMY

A continuous follow-up of all patients after gastrectomy will prove that there are many factors other than recurrent ulcer which may cause a poor result, but for the moment let us consider the results of "two-thirds to three-quarters" gastrectomy and of "three-quarters to measured radical gastrectomy" solely in terms of recurrent ulcer.

Table II shows that within eighteen months of operation 5 (3·7%) patients had developed recurrent ulcer after the "two-thirds to three-quarters" resection, whereas none in the second series treated by "three-quarters or more" gastrectomy has yet complained of symptoms suggesting a recurrence, though 200 have passed the critical eighteen months after operation. The more radical operation has therefore given a measure of increased protection; but, since only 60% of recurrent ulcers are said to develop within two years of operation, the danger of further recurrences developing later cannot be excluded. The figure of 60% is undoubtedly correct for recurrent ulcer after gastro-enterostomy; it remains to be proved if it also applies to recurrence after measured radical gastrectomy.

1. Walton, J. *Proc. R. Soc. Med.* 1944, **38**, 91.

TABLE II—RECURRENCE-RATE IN RELATION TO EXTENT OF RESECTION

Resection	—	Months since operation					
		6	12	18	24	30	36
2/3–3/4	No. of patients examined	139	136	135	135	132	132
	No. of fresh recurrences	1	2	2	0	0	0
	Total no. of recurrences	1 (0·7%)	3 (2·2%)	5 (3·7%)	5 (3·7%)	5 (3·7%)	5 (3·7%)
3/4–M.R.G.	No. of patients examined	306	252	200	148	90	19
	No. of recurrences	0	0	0	0	0	0
2/3–M.R.G.	Total no. of patients available for follow-up	445	388	335	283	222	151

M.R.G. = measured radical gastrectomy.

The only way to decide the relative protection against recurrent ulcer given by "half to two-thirds," "two-thirds to three-quarters," and measured radical gastrectomy is to follow up an adequate series of unselected patients to observe the incidence of recurrent ulcer and the type of patient in which the ulcer tends to recur. Unfortunately no such detailed analysis has yet been published in this country; published reports group all cases under the collective heading of "gastrectomy," without indicating the size of the stomach left in situ.

Heuer et al.,[2] of New York Hospital, favour limited resection. Most of their cases were treated by a "half to two-thirds" gastrectomy. A small minority only were dealt with by a "two-thirds to three-quarters or more" gastrectomy. As a result of their experiences with 142 gastrectomies they note:

> "It would appear of doubtful value to pursue the idea of ensuring achlorhydria, and therefore better results, by larger and larger resections.
>
> "A resection of lesser magnitude—i.e., one-half to two-thirds—is indicated because it is easier to perform, it is attended by a lower primary mortality, and it gives results within 10% of the more extensive operation.
>
> "It may be better to accept the limitations of resection, and adopt an operation of lesser magnitude which permits further surgery if recurrence takes place."

Their argument in favour of limited resection is based on two observations: (1) their major resection (two-thirds to three-quarters or more) does not give complete protection against recurrence; and (2) their major resection causes a prohibitively high operative mortality.

The deliberate performance of a conservative operation (which, they admit, gives 10% less satisfactory results than does the major operation) merely to provide for an easier secondary operation to cure the expected recurrent ulcers is an argument unlikely to appeal to many surgeons (or patients).

Our experience in York confirmed the observation of Heuer et al. that a "two-thirds to three-quarters" resection does not give complete protection against recurrence; but, instead of accepting the lesser protection of a more conservative resection, we developed a more radical procedure, and with increased experience we have found that, far from increasing, there has been no operative mortality among the last 105 cases.

We treated our 5 recurrent ulcers by a radical secondary gastrectomy, and we noted that, in spite of the small size of the gastric remnant left, these patients remained perfectly well. It therefore seemed reasonable to perform this more radical operation in the first place on all patients as a routine, if a greater degree of protection against recurrent ulcer could be provided.

2. Heuer, G. J., Holman, C., Cooper, W. A. The Treatment of Peptic Ulcer. London, 1944.

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The more radical resection does not necessarily mean a higher mortality; and, though the proportion of satisfactory results differs very little, the high incidence of recurrent ulcer is a most serious drawback of the conservative operation (table III).

The line of section of the stomach is undoubtedly one of the factors which determines the recurrence-rate (fig. 3). Heuer et al.[2] report 5·3% recurrences after

TABLE III—COMPARISON OF RESULTS OF $^1/_2$–$^2/_3$ RESECTION WITH RESULTS OF $^2/_3$ TO MEASURED RADICAL GASTRECTOMY

—	$^1/_2$–$^2/_3$ (Heuer et al.[2])		$^2/_3$–M.R.G. (present series)	
	D.U.	G.U.	D.U. and G.D.U.	G.U. and G.D.U.
No. of cases	83	59	402	113
Operative mortality ..	6·0%	8·4%	2·9%	5·4%
Satisfactory	89·4%	94·3%	95·3%	97·8%
Recurrences	5·3%	0	0·8%	0

a "half to two-thirds" resection. In the present series (table II) there were 3·7% recurrences after "two-thirds to three-quarters" resection. By moving the line of resection considerably nearer the cardia we have so far eliminated any recurrence in the 350 cases treated by this more radical gastrectomy.

GASTRIC FOLLOW-UP CLINIC

Surgical treatment does not mean just operation and then abandoning the patient to his own devices. We have found that an intensive follow-up will materially increase the number of satisfactory results; for, if the functional element is neglected, many patients will be disappointed with the results.

Every patient is seen at monthly intervals for the first six months, after which he is transferred to the gastric follow-up clinic, where he is seen by appointment every six months. If a longer interval is left, many will have changed their address and disappeared.

We send a questionnaire to every patient a week before his regular six-monthly visit to the follow-up clinic is due. If he cannot come he returns it, and the board grade him according to his answers. Where a returned card indicates that a patient does not clearly understand what is meant by the questions asked, the almoner or the welfare officer calls to explain. If a returned card suggests that the patient has pain or vomiting, or has lost work, a special appointment is made for personal examination and interview. Every patient with an unsatisfactory result is seen personally at least twice a year, none maintaining contact by post only.

In answer to 868 questionnaire cards sent out in 1947, 210 patients were seen at both their appointments in the follow-up clinic, and 150 patients were seen once and replied by card once. Only 73 (16%) replied by card both times, and it would be unreasonable to expect a higher proportion of absolutely fit men to lose two half-days' work each year merely to report progress. The majority of card returns are from people who have left the district.

In 8% of the patients a reminder letter was required, and 4% required a second reminder. It was necessary to visit 2% in their own homes to discover why they refused to reply. Only one patient was lost sight of in 1947.

Many of these patients have moved to other towns since the war, and some have gone abroad, which makes it increasingly difficult to maintain contact.

GRADING OF RESULTS

Grading was assessed on gastric symptoms only. Capacity for work must be considered separately, for many men will continue working in spite of pain, and some become unemployed, or retire, or change to a light job because they are getting old.

No surgeon should do his own grading, because it is almost impossible to avoid the bias of enthusiasm. In the York clinic a physician (Dr. D. R. Cameron) and the radiologist (Dr. C. N. Pulvertaft) discuss each case with the surgeon (A. H. V.), and an agreed assessment is entered. The advantage of this close coöperation with a physician and a radiologist needs no elaboration.

We have found it convenient to describe five grades:

Grade I: no gastric symptoms (fullness after extra large meal is allowed).

Grade II: no pain; mild occasional symptoms only, easily controlled by care; care includes rest, limitation of size of meal, and rejection of certain articles of diet.

Grade III: mild symptoms not controlled by care. This grade is subdivided into IIIs (satisfactory) and IIIu (unsatisfactory).

Grade IV: not improved.

Grades I and II are clearly excellent results, for they are symptom-free. Grade IV are failures. The intermediate grade III includes all patients with mild symptoms which do not respond to care. At one extreme are patients with only mild fullness which persists in spite of care. They are completely satisfied. At the other extreme are patients with similar symptoms which leave the patient or the board dissatisfied, or in whom the period of rest or limitation of diet interferes with enjoyment of life. These patients must obviously be placed in a separate group. We therefore subdivided grade III into satisfactory and unsatisfactory; in practice it is not difficult to place the patient in his correct category.

Our conception of a satisfactory result is covered by grades I, II, and IIIs. Both the patient and the examining board are satisfied with the result. Symptoms and the care taken to control them do not interfere with the patient's enjoyment of life or his efficiency at work.

The result is considered unsatisfactory if either the patient or the board is not satisfied with the result, and symptoms or the steps taken to avoid them interfere with the enjoyment of life or efficiency of work.

The difference between IIIs and IIIu is partly determined by the frequency and severity of the "mild symptoms which persist in spite of care" and partly by the reaction of the patient to the symptoms. Thus a neurotic may be incapacitated by a degree of fullness which would be ignored by a man of more balanced temperament. The former is grade IIIu, the latter grade IIIs.

If pain other than mild discomfort is present, the result is considered unsatisfactory. In every case a direct question is asked about each symptom, and a general remark such as "I have no trouble at all" is not accepted as meaning absence of symptoms.

It is almost impossible to convey in statistical tables a true picture of our own conception of a "satisfactory" or an "unsatisfactory" result. This can only be gained by visiting the follow-up clinic. Figures alone are never so convincing as the practical demonstration, and no written word can compare with the dramatic sincerity and entertaining expressions with which patients describe their feelings.

PRESENTATION OF RESULTS

Two problems are involved: the grouping of the five grades, and the postoperative stage at which results are to be analysed.

Grouping of Grades.—By reporting all five grades in detail the possibility of misunderstanding and confusion due to personal interpretation is reduced to a minimum. Results in this series are also summarised. Grades I and II are undoubtedly excellent. Grades IIIu and IV are failures, though many of the patients have only mild symptoms and are much improved. This leaves a small group, IIIs, of patients who are improved and satisfied with their results but not completely free of symptoms.

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Postoperative Stage at which Results should be Analysed.—Three methods are suggested:

(1) The "six months to twelve years" survey to indicate the present grading of all patients available for follow-up.
(2) The continuous follow-up of all patients to show their grading at six-month intervals.
(3) The continuous follow-up of separate groups of 100 patients to show their grading at six-month intervals.

OPERATIVE MORTALITY

There have been 25 deaths (4·9%) in the 505 gastrectomies done in 1936–47. This figure does not represent the operative risk now, for the mortality has fallen owing to improved team-work, and increased experience, as the following figures show:

Cases 1–75 (75 gastrectomies): 9 deaths (12%).
Cases 76–505 (430 gastrectomies): 16 deaths (3·7%).

We verified by necropsy the cause of death in every case as follows:

Cases 1–75 with 75 gastrectomies and 9 (12%) deaths

- 1 Overdose of thiopentone.
- 1 General peritonitis; no leak at suture line; ? cause.
- 1 Congenital contracted kidneys; uræmia.
- 2 Pneumonia.
- 1 Gangrene of colon.
- 1 Hæmatemesis (gastric suture line).
- 1 Retention, uræmia (kidney stone).
- 1 Shock.

It is obvious that most of these deaths were avoidable. Some were due to technical incompetence and inexperience (gangrene of colon, hæmatemesis, and general peritonitis) and others to lack of correct aftercare (shock, pneumonia, retention, and uræmia). Selection of an unsuitable anæsthetic was responsible for 1 death, where soluble thiopentone was the only anæsthetic used.

After these unfortunate experiences we organised a more careful routine. I watched as many surgeons operating as was possible, and their helpful criticism and advice made many difficult steps seem easy. Finally, we became a team, each member of which knew his or her part. Complications were anticipated, and, as a result of skilled nursing, mortality fell to 3·7% for the next 430 gastrectomies.

In the later series the causes of death were as follows:

Cases 76–505 with 430 gastrectomies and 16 (3·7%) deaths

- 4 Pulmonary embolus.
- 2 Uræmia.
- 3 Pulmonary collapse and pneumonia.
- 1 Peritonitis (gastric suture line).
- 1 Hæmorrhage (gastric suture line).
- 4 Shock and circulatory failure.
- 1 Efferent-loop obstruction.

The causes of death in this series were still too often the result of failure of operative technique (peritonitis, intraperitoneal hæmorrhage—both at the gastric suture line—and efferent-loop obstruction). Delayed shock again caught us slow at recognising the onset of this dangerous complication.

We thought that the first three pulmonary emboli might be due to thrombosis associated with intravenous saline introduced into the leg; so this therapy was discontinued. The fourth embolus occurred in a patient who was encouraged to walk round his bed from the first day after operation; yet a succession of emboli caused his death on the eleventh day.

The longest consecutive series without a death was 128 cases, but 2 pulmonary emboli ended this run of good luck. The last 105 patients operated on have all survived, of whom 36 were dealt with since this survey was closed.

The operative mortality of 430 gastrectomies done on the last 425 patients in the series has been analysed in relation to type of ulcer, chronic perforation, length of history, and age of patient.

Type of Ulcer

The mortality was as follows:

	D.U. (including G.D.U.)	G.U. (including G.D.U.)	S.U.
No. of cases	347	93	29
No. of deaths	10 (2·9%)	5 (5·4%)	1 (3·5%)

The relatively high mortality of operation for G.U. is difficult to explain, but it agrees with other recent reports. Provided the ulcer is not too high, operation for G.U. is technically easier than for D.U.; and, even if the ulcer has penetrated into the liver or the pancreas, it can be separated bloodlessly by blunt dissection. In such cases the stomach contents may not be sterile; yet infection played no part in 4 of the 5 fatal cases.

The causes of the 5 deaths were as follows:

(1) Error of judgment in selection of patient for operation.

Case 235.—A frail woman aged 63. Four previous abdominal operations leaving multiple incisional hernias. Massive adhesions; postoperative renal suppression; necropsy showed contracted kidneys. Contributory cause may have been the time factor, for repair of the hernias caused delay (85 min.).

Incapacitating pain made us accept an unjustifiable risk.

(2) Error of operative technique.

Case 277.—Damage to middle colic artery leading to gangrene of transverse colon.

Case 295.—General peritonitis caused by leakage at gastric suture line.

(3) Error of postoperative care.

Cases 348 and 432.—Postoperative shock. In both cases operation was not unduly difficult and was completed within 60 min. The condition of the patients immediately after operation gave no anxiety; yet within 36 hours blood-pressure had fallen, pulse-rate had risen, and both patients died from peripheral circulatory failure and delayed shock.

Our mismanagement of fluid balance in these cases was probably the cause of failure.

Chronic Perforation

The mortality was as follows:

	S.U.	Chronic perforation
No. of cases	287	143
No. of deaths	8 (2·8%)	8 (5·6%)

Patients whose ulcers have penetrated deeply into surrounding viscera, producing a chronic perforation, seem especially liable to have complications, and the risk of operation is twice as great in them as in patients whose ulcers have not penetrated through all coats of stomach or of duodenum; 3 of the 4 pulmonary emboli occurred in such patients.

Length of History

The mortality was as follows:

	History: Over 5 years	Under 5 years
No. of cases	318	112
No. of deaths	14 (4·4%)	2 (1·8%)

Some patients give a history of over ten years, and a history of over twenty-five years is not uncommon. The figures given above show the serious effect on operative mortality of delaying effective surgical treatment. If the history is allowed to extend over five years, the risk at operation is increased $2^1/_2$ times.

Age of Patient

The mortality was as follows:

Age (years)	10–19	20–29	30–39	40–49	50–59	60–69	70 and over
No. of cases	4	31	120	161	86	26	2
No. of deaths	0	0	1	8	5	2	0
			0·8%	5·0%	5·8%		

Most deaths were unexpected. They occurred in good risk patients and bore no relation to the expected

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hazards of the operation. The margin of safety is less in those aged over 50, but the two deaths in those aged over 60 were due to errors of technique (efferent-loop obstruction and gangrene of colon) and had no relation to the age of these patients.

INTERCURRENT DEATHS

The causes of the 12 intercurrent deaths were verified by necropsy, laparotomy, or examination of the death certificate, as follows:

Pneumonia	Verified by necropsy.
Car accident	,, ,, letter.
Pulmonary tuberculosis (3 cases)	,, ,, necropsy.
Heart-failure (2 cases)	,, ,, ,,
Pneumonia	,, ,, death certificate.
Carcinoma of gall-bladder (2 cases)	,, ,, laparotomy (A. H. V.).
Subarachnoid hæmorrhage	,, ,, ,,
Carcinoma of gastric remnant	,, ,, ,,

LATE DEATHS

Two late deaths were due to the original ulcer or operation. One patient was discharged apparently fit and well but was readmitted with suppurative pancreatitis, from which he died eight weeks after his first operation. The second died of uræmia. Post-operative catheterisation had caused cystitis, and though discharged in reasonable comfort the patient ultimately developed prostatic symptoms and died at home.

(To be concluded)

PENICILLIN AND SULPHONAMIDES IN TYPHOID FEVER

EXPERIENCE OF PHYSICIANS IN MILITARY HOSPITALS IN THE MIDDLE EAST

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IN 1946 Bigger observed that, though the growth of *Salmonella typhi* was influenced little by either penicillin or sulphathiazole acting independently, a combination of these two agents prevented the growth of artificially cultured typhoid organisms. He believed that this action was synergistic, the sulphathiazole being bacteriostatic and the penicillin bactericidal, and that, to be effective, the dose should be proportional to the number of organisms present. He suggested that it might be possible to administer these substances in vivo in concentrations sufficient to sterilise the blood-stream during the septicæmic stage of typhoid fever, so allowing the antibodies of the host to deal with organisms in the tissues.

A little later in the same year McSweeney (1946) described the results which he had obtained in a clinical trial of this combined therapy. The 6 cases of typhoid which he treated showed dramatic improvement, and he recommended that during a four-day period a patient should be given 10 mega units of penicillin and 34 grammes of sulphathiazole and that the course should be repeated after two days' rest. In no instance did he initiate treatment before the tenth day, and more usually it was delayed until the third week of the illness. The response was rapid. Except in his first case, where small doses had been used, the blood was sterilised, the temperature settled, and the toxæmia strikingly abated; moreover these effects were apparent during the first course of treatment.

Cases of typhoid fever are constantly under observation in the Middle East, and in the autumn of 1946 and early months of 1947 a number of patients were treated with penicillin and sulphathiazole in British military hospitals. Unfortunately, however, though the doses given were comparable with those advocated by McSweeney, his methods of administration were closely followed only on rare occasions. When the first patients came under treatment the supplies of penicillin were limited. It was therefore decided to restrict the combined therapy to patients who were seriously ill and in whom the diagnosis of typhoid fever had been confirmed bacteriologically.

There cannot be any doubt when a new remedy is truly specific for the disease or diseases which it is designed to treat. Thus it was clear from the outset that sulphonamides reacted specifically against such bacteria as meningococci, streptococci, and pneumococci, and that penicillin did against diseases due to these and certain other organisms. On the other hand, the response to penicillin and sulphonamides of subacute bacterial endocarditis due to *Strep. viridans* was less dramatic, and a considerable volume of research was required to prove beyond doubt that the treatment was effective.

It was clear by the New Year of 1947 that typhoid fever did not respond to the treatment we were giving in the dramatic and specific way that pneumonia did, but it seemed possible that it might be reacting in the leisurely way of subacute bacterial endocarditis. To obtain a more accurate opinion, and with a view to standardising the dosage and methods of administration of the therapeutic agents, a questionary was circulated to the physicians at the various hospitals concerned. This paper is based on the answers to those questions. My task has been to correlate the reports of various doctors and nursing sisters, and I have tried to present the results in a manner as impersonal and unbiased as possible.

GENERAL CONSIDERATIONS

Doubts about the efficacy of a therapeutic agent are most readily resolved by comparing the course of a disease among patients living under identical conditions save that half their number, selected at random, are given the treatment which is the subject of the trial. To ensure that the present investigation was adequately controlled, the treated and the untreated patients should have had similar preventive inoculation records, should have been admitted to hospital at a comparable stage of the disease, and should have received similar symptomatic and dietetic treatment; furthermore, the disease should have been acquired from the same source in comparable circumstances and should have been of comparable severity in the two groups.

Inoculation records were as follows:

	Penicillin and sulphonamides	
Up to date	*Not given*	*Given*
Inoculated less than 6 months before onset of illness	4	4
Inoculated more than 6 and less than 12 months before onset	9	4
Inoculated more than 12 and less than 18 months before onset	1	2
Inoculated more than 18 and less than 24 months before onset	5	3
Total	19	13
Not up to date		
Inoculated more than 24 months before onset	0	1
Never inoculated	13	5
Total	13	6

Army requirements for T.A.B. inoculation involve annual maintenance doses.

Except that the control group is larger than the treated group, there is little difference between the two. The only soldier whose inoculation record was out of date was a man who had refused further injections after his initial dose of T.A.B. three years previously. The uninoculated patients were all civilians. Most of the patients had been in the Middle East less than a year and were men in their early twenties.

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It is often difficult to be certain exactly when an attack of typhoid fever starts and therefore to decide the duration of illness before admission to hospital. But in this respect there appears to be no essential difference between those who had penicillin and sulphonamides and those who did not. On the other hand, though an attempt was made to ensure, even in the acute stages, a fluid diet yielding at least 1250 calories a day, there were undoubtedly minor differences in the diets of various patients. Similarly, symptomatic treatment varied slightly according to the whim of the doctors concerned.

Since there was no single epidemic of sufficient size to allow of statistical analysis, cases occurring in small outbreaks have had to be combined. These have originated from different sources, have been due to different strains of organism, and have varied much in severity. Experience has shown that the severity of an epidemic

TABLE I—RESULTS OBTAINED AT CENTRE A (EGYPT)

Case no.	Day admitted	Day on which penicillin and sulphonamides started	Days of pyrexia	Days in hospital	Remarks
1	3	6	19	63	—
3	3	6	26	26	Died of heart-failure; albuminuria
5	4	6	33	61	—
7	2	6	24	47	Albuminuria; persistent tachycardia
9	1	6	28	48	Intestinal hæmorrhage; typhoid not proved bacteriologically
2	3	—	45	63	Persistent tachycardia
4	3	—	22 + 10	66	Relapse in 8th week
6	2	—	9	9	Died; parotitis; albuminuria
8	1	—	28	49	—
10	3	—	50 + 19	112	Relapse

Case 6 had small doses of penicillin for parotitis.

bears no relationship to the phage type of the organism, and, though in each epidemic cases seem to conform to a pattern, there is no way of forecasting how serious the outbreak will be. Such differences are important in analysis; for example, the patients in two epidemics which developed almost at the same time were treated by similar methods by the doctors and nurses of the same hospital. Toxæmic cases were seen in both epidemics, yet in the first outbreak all of 20 patients recovered, whereas in the second 6 of 9 died. If large doses of penicillin and sulphonamides had been given to one set of patients and not to the other, false conclusions might easily have been drawn. Even if the necessary conditions for a controlled investigation had been satisfied, it is doubtful whether the total number of cases was adequate, or the criteria for measuring improvement sufficiently well defined, to enable conclusions to be drawn by statistical methods. Indeed the only factual observation which is worth citing is the effect of treatment on blood-culture. Of 11 cultures taken during treatment with combined penicillin and sulphonamides 8 were positive, and of 9 specimens taken immediately after the course of treatment 6 were still positive.

An undoubted reduction in mortality would be significant; but, as pointed out above, the death-rate varies so widely in different epidemics that hundreds of cases would have to be observed before a reliable index of mortality could be obtained. There is no great difference in the time spent in hospital between the patients given penicillin and sulphonamides in addition to the routine treatment of typhoid and those given the

TABLE II—RESULTS OBTAINED AT CENTRE C (IRAQ)

Case no.	Day admitted	Day treatment started	Days of pyrexia	Days in hospital	Remarks
1	2	8 & 19	26	72	Sporadic; 2 courses
2	4	7	27	66	Hæmaturia
3	5	—	39	80	Bronchopneumonia
4	5	—	35	79	Not proved bacteriologically

Case 3 had penicillin in small doses for bronchopneumonia.

routine treatment only; but even these figures are likely to be vitiated by complications, such as femoral thrombosis, which may delay the discharge of a patient for long after the active disease has abated. The duration of fever may be hard to define if a continuing slight swing makes it impossible to decide when the temperature has subsided, or if, after days or even weeks of normal temperature, there is a sudden burst of pyrexia. Finally, there is no satisfactory way of recording the degree of toxæmia; and a patient who is considered to be "dangerously ill" because he has passed blood per rectum may be in far less danger than his neighbour who only looks "a bit toxic." Similarly, what may prove to be a fatal perforation of the intestine may be the first symptom which brings the patient under observation.

For these reasons I do not think it feasible to analyse statistically the reports on which this paper is based. The facts are set down for those who like manipulating figures, but for the rest it will be sufficient to quote the impressions of those who observed the effects of treatment in each epidemic.

RESULTS

Centre A (Egypt) (table I)

In this moderately severe outbreak (phage type A) 10 cases were divided, by the method of alternate admissions, into two groups. Besides the routine treatment of typhoid fever, patients in the first group received 600,000 units of penicillin and 1·5 g. of sulphathiazole every three hours, and a total dose of about 20 mega units and 50 g. in four days, sulphadiazine being substituted when vomiting was troublesome. Blood-culture, temperature, and complications were little affected. The patients in the second group received routine treatment only.

Lieut.-Colonel H. J. Anderson reported that in his opinion treatment with penicillin and sulphonamides had proved useless; and that the frequent injections which were necessary interrupted the patients' rest—a view supported by the nurses. A similar opinion was expressed by Major H. M. Wotzilka and Major T. D. Kellock, medical specialists at the hospital.

Centre B (Egypt)

There were two small outbreaks, one consisting of 3 (phage type D), and the other of 2 (phage type E), cases in British personnel. In each outbreak one patient was given "specific" treatment, while the other, rather milder, cases were given the standard treatment. Clinical particulars of the latter cases are not available for analysis. The specific treatment of the 2 patients was started on the tenth and fourteenth day respectively, and both were admitted during the first week of illness. Of the first patient Major E. L. Frankel writes:

> "In my opinion the administration of penicillin and sulphathiazole did not affect the course of the disease, which ran a similar course to the other 2 (control) cases. The doses employed were 250,000 units of penicillin three-hourly and 6 g. of sulphathiazole daily, and the drugs were given for eight days."
>
> The second patient developed bronchopneumonia, and "the treatment appeared to have a beneficial effect on the lung condition . . . but the primary disease was unaffected

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with regard to pyrexia, blood-count, and toxæmia. The drugs were given in the same doses as to the previous patients, and treatment was continued for six days." (The reference to the blood-count is a reply to a question asking whether large doses of sulphathiazole had any effect on the white cells.)

Centre C (*Iraq*) (table II)

One patient in a small outbreak of 3 cases (Craigie Old Be) and 1 sporadic case of typhoid (Craigie Old B2) were treated with 10 mega units of penicillin given by intermittent intramuscular injection over four days, together with 30–32 g. of sulphathiazole. Concentrations

TABLE III—RESULTS OBTAINED AT CENTRE D (CYPRUS)

Case no.	Day admitted	Day treatment started	Days of pyrexia	Days in hospital	Remarks
1	3	17	56	75	—
2	4	32	?	95	Relapse on 29th day
3	3	15	63	124	Toxic myocarditis; abscess of buttock
4	3	16	40	49	—
5	7	9	25	72	—

of penicillin in the blood were insufficient to inhibit the growth of organisms in vitro (0·6 unit per ml.).

Lieut.-Colonel T. A. Kemp writes of case 1:

"This is the only case that has been given McSweeney's course in every detail—two-hourly injections of penicillin, sulphathiazole rather than the more recent and less toxic sulphonamide preparations, and two courses of treatment. He was a sporadic case, so that no controls are available for comparison. However, he continued to 'crop' profusely throughout the first course, his toxæmia was unaffected, and my own impression was that the natural history of the disease was quite uninfluenced by the treatment with penicillin and the sulphonamide."

And of case 2 he says:

"The massive course of penicillin and sulphonamide may have had a slight effect on the course of the disease, as the onset was very severe. Personally I doubt it, as he continued to 'crop' throughout the course of treatment and the character of the chart is not dissimilar from . . . (that of a patient receiving normal treatment) in the same epidemic. The second course was not given."

Some cases of paratyphoid were also treated; and, commenting on the treatment as a whole, Lieut.-Colonel Kemp says:

"The treated and control cases differed only in that the more severe cases were generally selected for treatment. Bronchitis, abdominal distension, and diarrhœa were more frequent and severe in the treated cases, which I take to be merely a reflection of the severity of the initial infection. One case of intestinal hæmorrhage and one of hæmaturia occurred after therapy, and one case of intestinal hæmorrhage occurred before therapy. There was no bleeding among the controls. None of the records shows the dramatic improvement that is to be expected when specific therapy is applied to a disease process."

Major I. M. Sinha, medical specialist to the hospital, agreed with these views.

Centre D (*Cyprus*) (table III)

There were two outbreaks of typhoid among uninoculated civilians. Illness in the first epidemic of 9 cases ranged from moderate to severe. The 4 cases judged to be most severe were given, in four days, 10 mega units of penicillin by intermittent intramuscular injection and 37 g. of sulphathiazole. (The first case treated received only 7·5 mega units and 28 g.) The second outbreak was mild. It consisted of 10 cases, in only 1 of which was the combined treatment given. Particulars of control cases are lacking, except that the average period spent in hospital was 49 days.

Sulphathiazole and penicillin were not given concurrently in case 2; the abscess developing at the site of a penicillin injection in case 3 was opened, and the pus contained living typhoid bacilli.

Capt. A. H. Banton comments: "In no case was any beneficial result of this line of treatment apparent, either in fall of temperature or diminution of toxæmia."

Centre E (*Palestine*) (table IV)

This was an outbreak of 13 moderately severe cases (phage type B3). Five of these, the worst cases (A in table IV), were given penicillin in doses ranging from 10 to 12 mega units, by intermittent intramuscular injection, and 48–52 g. of sulphathiazole by mouth in four days; 4 mild cases (B in table IV) were not given specific treatment; and 4 moderately ill cases (C in table IV) were given penicillin in "ordinary" doses. Particulars are also given of 4 sporadic cases (D in table IV) which received the large doses of penicillin and sulphathiazole.

On behalf of Lieut.-Colonel R. R. Henderson, Captain A. I. MacLeod, physician in charge of the typhoid ward, wrote:

"In September and October, 1946, massive doses of penicillin and sulphathiazole were given in 4 sporadic cases of typhoid fever and 1 case of paratyphoid-B fever. There were no adequate controls for these patients (nos. 14–17), but in none were dramatic results obtained

"There was no effect on the temperature or pulse-rate, which continued to rise and fall according to the previous tendency, and the effect on the general condition was difficult to assess."

Nevertheless, in the case-notes of one of these patients he had recorded "no effect on fever—in fact temperature level went up—but definite relief of toxæmia." Despite this improvement, two days after the course had finished the patient deteriorated and died.

The opportunity for a better-organised clinical trial came in November, 1946, when the larger outbreak occurred. Apart from the patients on full treatment, 4 were given penicillin alone, in doses of 50,000 units three-hourly, and 4 were not given specific treatment—they were "on the whole the mildest of the series, though one had a typhoid bacilluria and persistent tachycardia which delayed his convalescence."

TABLE IV—RESULTS OBTAINED AT CENTRE E (PALESTINE)

Group	Case no.	Day admitted	Day treatment started	Days of pyrexia	Days in hospital	Remarks
A	1	5	8	42	72	Sulphonamide rash; relapse 32nd day
	2	9	13	44	73	Intestinal hæmorrhage
	3	4	9	28	70+	Sulphonamide rash; femoral thrombosis; pulmonary infarct
	4	3	6	19	61	Severe vomiting
	5	3	10	33	73	—
B	6	7	—	19	44+	—
	7	2	—	10	45	—
	8	8	—	32	70	Typhoid bacilluria; persistent tachycardia
	9	3	—	13	44	—
C	10	6	9	12	12	Perforation; died
	11	7	14	42	76	—
	12	9	13	24	58	—
	13	3	6	17	51	—
D	14	4	14	23	23	Sporadic
	15	3	9	22	50+	Sporadic
	16	1	17	31	72	Sporadic; in hospital at onset
	17	2	9	28	62	Sporadic

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"Those who received the massive penicillin doses did not realise that they were being dealt with differently. They fully realised that they were receiving tablets which made them feel sick. All patients were given phenobarbitone gr. 1 b.d., which was found of value both in reducing nausea and in helping all to sleep. In only 2 cases was there any hint of an effect on the fever. Steady improvement seemed to be the rule, no matter what the treatment. There was no bacteriostatic effect in the blood, let alone a bactericidal effect. Penicillin levels were estimated in 2 cases and were found to be $^1/_2$–2 units per ml. within the limits of accuracy (50–100% either way!). Since very adequate sulphathiazole levels seem to have been obtained here, the only method of improving treatment is by boosting the blood-penicillin level."

It may be added that Lieut.-Colonel Anderson and Major Wotzilka gave penicillin to 2 patients in massive doses without influencing the course of the disease or the blood-culture. In 1 case 24 mega units was given in twenty-four hours by continuous intravenous drip, and in the other 3 mega units was given by intramuscular injection every three hours for twenty-four hours.

Centres F and G (Egypt)

Unfortunately circumstances made it impossible to get full details of either of these outbreaks. The first consisted of about 20 cases of typhoid (phage type C), and penicillin in doses of 60,000 units three-hourly and sulphathiazole were used for seven days. This treatment was regarded as of value in minimising the chest infection, and Captain Bannister and the nurses with whom she was associated "received a distinct impression that treatment with penicillin and sulphathiazole was helpful in lessening toxæmia in the severe cases."

The second outbreak also involved some 20 cases. Penicillin was given in conventional doses to prevent chest complications, but only in 2 cases was McSweeney's (1946) dosage adhered to. Lieut.-Colonel A. Leese, who saw these cases, was "convinced that massive penicillin had no effect."

DISCUSSION

The conclusions drawn both by doctors and nursing sisters in M.E.L.F. was that treatment with penicillin and sulphonamides would have to produce much more dramatic results in the way of a rapid cure of the illness if the disturbance to the patient of repeated injections was to be counterbalanced.

There are reasons which may explain why we did not obtain the results obtained by McSweeney. The most obvious is that his methods were not strictly followed. Then it is possible that we were dealing with insensitive organisms. This is unlikely, since many different epidemics were under treatment, but it has to be remembered that Evans (1946), in experiments with 66 different strains of *S. typhi*, demonstrated well-marked variations in sensitivity to penicillin which were not related to the phage type of the organism. Again, commercial preparations are said to contain three or four different penicillins, some of which may be biologically inert (*Lancet* 1946), and we may have been unlucky in our choice of preparation. Finally, treatment was rarely instituted early in the first week, when presumably it would be most effective in dealing with the infection; but it must be pointed out that in McSweeney's cases treatment was also started late in the illness.

I wish to thank my colleagues for the excellent records which they have generously allowed me to study and from which I can only draw one conclusion—i.e., that the ideal treatment for typhoid fever as it occurs in the Middle East has yet to be discovered.

I am indebted to Major-General F. Morris, C.B.E., K.H.S., director of medical services, M.E.L.F., for permission to publish this paper.

REFERENCES

Bigger, J. W. (1946) *Lancet*, i, 81.
Evans, R. W. (1946) *Ibid*, ii, 113.
Lancet (1946) ii, 353.
McSweeney, C. J. (1946) *Lancet*, ii, 114.

PHYSIOLOGICAL JAUNDICE OF THE NEWBORN

SOME NEW MEASUREMENTS OF THE FACTORS CONCERNED

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THE plasma of the human infant at birth contains a concentration of bilirubin which on the average considerably exceeds the figure for normal adults; the concentration increases rapidly after birth to reach a peak at 2–5 days and thereafter slowly decreases (Hirsch 1913, Yllpø 1913). There are wide variations between different infants.

At present two main theories of the causation of this icterus hold the field. The first view, which appears in almost all British textbooks, both of hæmatology and of pædiatrics, is that the jaundice is due to hæmolysis; it is said that in utero the fœtus acquires an abundance of red cells and hæmoglobin as a response to the anoxic conditions of fœtal life; after birth the infant no longer requires this high oxygen-carrying power, and the excess red cells are destroyed, causing jaundice (Goldbloom and Gottlieb 1929). The second theory ascribes a major rôle to the liver. It is held that, though the bilirubin comes from excessive hæmolysis in the postnatal period, the main factor determining the appearance of jaundice is a functional immaturity of the liver which renders it unable for the first few days of life to excrete the extra load of bilirubin (Yllpø 1913, Rich 1930). This second theory is almost universally accepted by workers in this field.

The evidence in favour of the second theory and against the first theory may be briefly summarised as follows:

(1) In utero the percentage of hæmoglobin in the fœtus is only slightly higher than that in the adult. The very high hæmoglobin values sometimes encountered in the newborn are mainly due to the "transfusion" that the infant receives from the placenta at birth (DeMarsh et al. 1942). From the high levels attained after birth there is only a slow rate of fall, and this rate is not correlated with the intensity of the jaundice (Mitchell 1929).

(2) Those infants who show the greatest degree of bilirubinæmia excrete less and not more bile pigment in the stools and urine (Yllpø 1913, Snelling 1933, Ross et al. 1937).

(3) The concentration of serum-bilirubin in the cord blood is correlated with the subsequent course of the bilirubin changes in the same infant; this strongly suggests that the development of jaundice is not determined mainly by postnatal hæmolysis (Hirsch 1913, Yllpø 1913, Davidson et al. 1941).

Though it is now widely accepted that the liver of the newborn infant is functionally immature, there is less agreement about the extent of postnatal hæmolysis. Thus, for instance, Weech (1947), in a comprehensive review of the subject, considered that an accelerated destruction of hæmoglobin began within a few hours of birth, whereas Findlay (1946) concluded that there was no evidence of increased hæmolysis during the neonatal period—"in fact, rather the reverse."

The question can be most satisfactorily settled by a direct measurement of the survival of the newborn infant's erythrocytes, and a brief preliminary account of some such measurements is given here.

METHOD

It may be assumed that blood taken from the placenta at birth is representative of the infant's blood, and it is highly probable that the erythrocytes of this blood, if transfused to a second newborn infant, will survive in

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much the same way as they would have done in the circulation of the donor infant. The methods adopted were therefore as follows:

Blood was taken from the placenta at birth after the cord had been cut; the blood was stored at 4°C for 24 hours or less in a disodium citrate glucose solution and transfused, via the umbilical vein, to other newborn infants as opportunity arose. Most of the recipients were infants with some degree of "shock" following delivery.

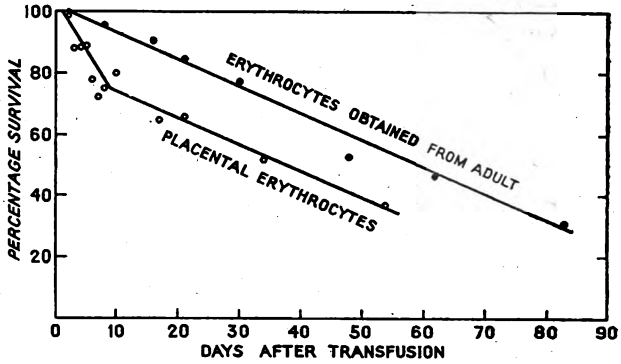
The survival of the transfused erythrocytes was estimated by the differential agglutination method of Ashby (1919), as modified by Dacie and Mollison (1943). Erythrocytes from adults were transfused to other infants, or occasionally to the same infant, and their survival too was estimated. These experiments provided control material for those in which placental blood was used.

RESULTS

These measurements have shown that the rate of disappearance of erythrocytes obtained from the placenta is rather greater than that of erythrocytes obtained from adults, about 20% of the "placental" erythrocytes being removed in the first ten days after transfusion compared with about 10% of erythrocytes obtained from adults. Thereafter the rate of disappearance of the placental erythrocytes decreases, and elimination is not complete until some 80–90 days after transfusion. The elimination of erythrocytes obtained from adults approximates closely throughout to a rate of 1% a day (cf. Mollison 1943). Actually, as Pickles (1947) points out, estimates of survival of erythrocytes in infants are affected by the increasing blood volume during the experiment. Unless this is taken into account, the rate of destruction appears to be greater than 1% a day; and, when the estimates are plotted graphically against time, the slope of elimination will be slightly curved rather than strictly linear. However, as pointed out by Pickles, correction of the estimates for increasing body-weight shows that the rate of elimination is constant and approximates to 1% a day. When the figures for the survival of placental blood were corrected for increasing body-weight, the estimates during the first ten days were scarcely affected, since the infant's body-weight at the end of that period was only very slightly greater than at birth. Thereafter the rate of elimination was constant; and, when the percentage survival was plotted graphically against time, the estimates from ten days onwards fell upon straight lines.

Estimates of the survival of the erythrocytes of placental blood and of adult blood transfused to two newborn infants are plotted in the accompanying figure. These cases have been selected as being typical of the majority studied; however, it must be pointed out that with the placental blood a considerable variation has been found, some cases showing a survival-rate which is throughout scarcely distinguishable from that of erythrocytes obtained from adults, and others showing a distinctly more rapid rate of disappearance than that in the case illustrated. Because the method of estimation carries a considerable error, and because the estimates are in any case affected by different rates of growth in different infants for which it may not be possible to correct accurately, it is obviously difficult to define the survival-rate with precision. For this reason further experiments are in progress in which placental erythrocytes and erythrocytes obtained from adults are being transfused to the same infant and their survival followed simultaneously.

These results help to confine speculation about the ætiology of physiological jaundice to narrower limits than heretofore. It may be concluded that initially the rate of destruction of indigenous erythrocytes in the newborn infant's circulation is approximately twice that of erythrocytes obtained from an adult. Since the amount of bilirubin formed depends on the total amount



Survival of placental erythrocytes and of erythrocytes obtained from an adult in two newborn infants. In both cases the measurements have been corrected for increases in body-weight.

of circulating hæmoglobin, as well as the rate of breakdown, the newborn infant is probably called on to excrete an amount of bilirubin which is proportionately almost three times as great as the amount formed by the adult. Nevertheless it is certain that this rate of pigment production would not produce jaundice if bilirubin excretion were as efficient as it is in the adult. For example, an adult can eliminate the equivalent of over 800 ml. of blood in seven days and only develop a bilirubin concentration of about 1·5 mg. per 100 ml. (Boorman et al. 1942). This rate of destruction corresponds crudely to destroying all the erythrocytes in forty days—i.e., at about three times the normal rate. Yet some infants who, as we have shown, are dealing with similar amounts of bilirubin show concentrations as great as 10 mg. per 100 ml. or more (Davidson et al. 1941). This piece of evidence, then, like so many others, points unmistakably to an impaired ability of the liver of the newborn to excrete bilirubin.

The rate of elimination of erythrocytes obtained from adults was not increased when the infant was polycythæmic. Even with total red-cell counts of 6·5–7·0 million per c.mm. the elimination-rate was still slightly less than 1% a day. It is conceivable that the infant's own cells might be treated differently, but these observations make it most unlikely that there is any mechanism which destroys erythrocytes when their concentration exceeds a certain value; thus, theories which speak of "the excess red cells being destroyed" are scarcely tenable.

In an attempt to measure the excretory function of the liver immediately after birth the rate of clearance of bromsulphalein has been measured, blood samples being taken with a fine plastic catheter passed up the umbilical vein into the area of the portal vein; this technique is based upon that introduced by Diamond (1947) for carrying out exchange transfusions in infants affected with hæmolytic disease of the newborn. In striking contrast to the finding in adults, in whom the plasma is usually practically clear about 45 min. after injection of the dye (Lippincott et al. 1945), we have observed the persistence of appreciable amounts of the dye at two hours (Mollison and Cutbush 1948). These observations confirm those of Herlitz (1927), but differ from those of Salmon and Richman (1943), who found a normal clearance of bromsulphalein in the neonatal period.

The significance of an impaired excretion of bromsulphalein is doubtful. Dragstedt and Mills (1936) showed that artificially induced bilirubinæmia interfered with the excretion of bromsulphalein; thus it might be contended that poor excretion of bromsulphalein in the newborn is due to hyperbilirubinæmia. However, the infants observed by us so far have shown no correlation between a relatively low serum-bilirubin and an increased ability to excrete bromsulphalein. It is clearly desirable to

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extend these observations so as to obtain more evidence of the factors affecting the excretion of bromsulphalein in the newborn, and to discover whether any appreciable amount of the dye is excreted in the bile during the first day of life. If the observations of Hess (1912) are correct, very few infants excrete any bile at all during the first twelve hours of life.

DISCUSSION

The results of the experiments on the survival of placental erythrocytes have an interest apart from their bearing on the origin of physiological jaundice. Erythrocytes obtained from the placental circulation may be assumed to be representative of the infant's own blood. Thus the survival-rate of these cells provides most interesting information about the red cells formed in late fœtal life. The work of Wintrobe and Shumacker (1935), in particular, has shown that the macrocytosis of the newborn represents a penultimate stage in the normal development of the blood, and it is thus not surprising that the erythrocytes of the newborn show a different survival from those of adults.

The mode of disappearance shown in the figure might be interpreted in two ways: (1) the initially more rapid disappearance might be a phase of active destruction by the recipient, due perhaps to polycythæmia; or (2) a mixed population of cells might have been transfused—i.e., a minority which disappear rapidly, and a majority which survive almost as well as erythrocytes obtained from adults. That the second explanation is correct is suggested by the fact that erythrocytes obtained from adults are not destroyed more rapidly in the first week or two when the infant is polycythæmic than they are subsequently when the infant's total red-cell count has fallen much lower. The cells which disappear rapidly may well be the most macrocytic ones, since it is known that the M.C.V. of the infant's erythrocytes falls appreciably during the first two weeks of life (Wintrobe 1947).

SUMMARY

The rate of breakdown of the newborn infant's own erythrocytes during the first ten days of life is about twice that of erythrocytes obtained from adults.

When allowance is made for the relatively greater red-cell mass of the infant, it may be concluded that the production of bilirubin may be proportionately almost three times as great in the newborn infant as in the adult. Nevertheless, this is not an amount which would produce in the adult the high serum-bilirubin levels which are encountered in the newborn.

From this evidence alone it can be concluded that the excretory capacity of the liver of the newborn is inferior to that of the adult, and that herein lies the chief cause of jaundice in the newborn.

The rate of removal of bromsulphalein from the plasma of the newborn infant is strikingly lower than the rate observed in healthy adults. This also points to a poor excretory capacity of the liver in the newborn, though it is admitted that this evidence could be interpreted differently.

The survival-rate of erythrocytes obtained from the placental circulation of the newborn differs in two respects from that of the adult's erythrocytes. Whereas the adult's erythrocytes disappear at a slow constant rate of rather less than 1% a day, giving an approximately linear slope when their survival is plotted graphically against time, the disappearance curve of the "placental" erythrocytes exhibits two phases: a first phase lasting about 10 days, during which about 20% of the erythrocytes disappear from the circulation; and a second phase in which the rate of disappearance is more gradual, with the result that elimination is not complete until some 80–90 days after the initial transfusion.

This probably means that at birth the infant has a less homogeneous population of erythrocytes than the adult. The bulk of the erythrocytes have a survival time not very much shorter than that of erythrocytes obtained from an adult; but there is a smaller proportion of the cells whose disappearance from the circulation is distinctly more rapid.

I wish to thank Prof. James Young for very generously giving space to this unit in his department and for allowing me to treat and investigate patients under his care; and Prof. R. A. McCance and Dr. A. C. Dornhorst for valuable suggestions during the preparation of this paper. The North and South London Blood Supply Depots have kindly supplied me with adult blood.

REFERENCES

Ashby, W. (1919) *J. exp. Med.* **29**, 267.
Boorman, K. E., Dodd, B. E., Mollison, P. L. (1942) *Brit. med. J.* ii, 535, 569.
Dacie, J. V., Mollison, P. L. (1943) *Lancet*, i, 550.
Davidson, L. T., Merritt, K. K., Weech, A. A. (1941) *Amer. J. Dis. Child.* **61**, 958.
DeMarsh, Q. B., Windle, W. F., Alt, H. L. (1942) *Ibid*, **63**, 1123.
Diamond, L. K. (1947) *Proc. R. Soc. Med.* **40**, 546.
Dragstedt, C. A., Mills, M. A. (1936) *Proc. Soc. exp. Biol., N.Y.* **34**, 467.
Findlay, L. (1946) *Arch. Dis. Childh.* **21**, 195.
Goldbloom, A., Gottlieb, R. (1929) *Amer. J. Dis. Child.* **38**, 57.
Herlitz, C. W. (1927) *Acta pædiatr., Stockh.* **12**, 1.
Hess, A. F. (1912) *Amer. J. Dis. Child.* **3**, 304.
Hirsch, A. (1913) *Z. Kinderheilk.* **9**, 208.
Lippincott, S. W., Ellerbrook, L. D., Hesselbrock, W. B., Gordon, H. H., Gottlieb, L., Marble, A. (1945) *J. clin. Invest.* **24**, 616.
Mitchell, J. M. (1929) *Amer. J. Dis. Child.* **38**, 518.
Mollison, P. L. (1943) *Arch. Dis. Childh.* **18**, 161.
— Cutbush, M. (1948) in preparation.
Pickles, M. M. (1947) dissertation for degree of D.M. Oxfd.
Rich, A. R. (1930) *Bull. Johns Hopk. Hosp.* **47**, 338.
Ross, S. G., Waugh, T. R., Malloy, H. T. (1937) *J. Pediat.* **11**, 397.
Salmon, G. W., Richman, E. E. (1943) *Ibid*, **23**, 523.
Snelling, C. E. (1933) *Ibid*, **2**, 399.
Weech, A. A. (1947) Advances in Pediatrics. New York; vol. II, p. 346.
Wintrobe, M. M. (1947) Clinical Hematology. London; p. 80.
— Shumacker, H. B. jun. (1935) *J. clin. Invest.* **14**, 837.
Ylppø, A. (1913) *Z. Kinderheilk.* **9**, 208.

COMBINED CHAULMOOGRATE AND SULPHONE TREATMENT OF LEPROSY AND TUBERCULOSIS

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AN important advance was made in the treatment and control of leprosy when the ancient oral administration of nauseating chaulmoogra oils was replaced by the injection of solutions of their most active constituents, in the form of either sodium hydnocarpate ('Alepol'), the result of the Calcutta investigations of 1915–19, or the ethyl-ester chaulmoogrates introduced by Dean and Holland in 1919 in Hawaii. And that too in spite of the fact that injections of chaulmoogrates did not clear a large proportion of the most dangerously infective advanced lepromatous cases, though they are effective in many of the early cases of all types discovered by repeated clinical examinations of contacts of known lepers.

In the last few years a further important advance has resulted from intravenous injections of the sulphone 'Promin' by Faget (1947) and his co-workers at the Carville leprosy settlement in the U.S.A., and by the oral administration of the sulphones 'Promizole' and 'Diasone' by the same workers and by Muir (1944) in Trinidad. Three years' use of promin has led to improvement in nearly 100% of the patients—mostly advanced ones—and 19 patients have been discharged after remaining bacteriologically free for more than a year. Moreover Muir (1947) has reported that several early war-time lepromatous cases have been cleared with diasone in 4–6 months, far more cheaply and quickly than advanced cases of the same type.

In the present paper what is known of the mode of action in leprosy of these two classes of remedies is

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considered to ascertain if they are complementary; for in that case it may well be that the quickest and most economical results will be obtained by the administration of both, especially in advanced lepromatous cases, the elimination of which would lead to a rapid fall in the incidence of leprosy as a whole by greatly reducing the number of new infections.

ACTION OF CHAULMOOGRATES IN LEPROSY

In my first paper (Rogers 1916a) on the treatment of leprosy by subcutaneous injection of "gynocardate of soda" (now known to have consisted mainly of hydnocarpate of soda) I recorded that nodules of not too advanced infective cases gradually decreased in size and might disappear. During this process repeated microscopical examinations revealed breaking up of the rod-shaped lepra bacilli before they disappeared from the lesions, usually without well-marked local reactions, but sometimes accompanied by sudden softening of nodules and slight temporary febrile disturbance.

Later I recorded (Rogers 1916b) that the intravenous injection of the same preparation produced greater improvement, and more rapid destruction of lepra bacilli within the skin lesions with more frequent mild reactions but no other ill effects. In 1918 I recorded details, with illustrations, of 26 cases which established the advantages of the Calcutta method of treatment. A coloured illustration included showed breaking up of a large proportion of the lepra bacilli in a stained preparation of serum from a reacting nodule. It was the repeated occurrence of such changes that first convinced me of the value of this modified treatment of leprosy. By that time I had personally given over a thousand intravenous injections within 14 months, with no ill results following the frequent mild reactions. However, the occurrence of local clotting in repeatedly injected veins, with their gradual occlusion, has prevented the general use of this more effective but time-consuming method of administration.

In 1921 I summarised $4^1/_2$ years' investigations in Calcutta, when favourable opportunities for further work on the subject had ceased (Rogers 1921). I then recorded two advanced cases in which the intravenous injections were followed by very long-continued fever and debility, but led to far more rapid progress than I have ever seen in such extensive lesions, and complete clearing in one case. In both these cases the serious reaction developed after only a few small intravenous doses; so I concluded that intramuscular injections should be given for several weeks before intravenous ones are given. When progress slows down or stops under such treatment an intravenous dose or two often produces slight and harmless reactions with more rapid destruction of lepra bacilli and clinical improvement.

SERUM-LIPASE VARIATIONS IN LEPROSY

In 1920 Dr. J. A. Shaw-Mackenzie informed me that he had found that the addition of a small quantity of sodium gynocardate or sodium morrhuate (prepared for me in Calcutta from cod-liver oil) to pancreatic lipase had the effect of doubling the fat-splitting action of the latter on olive oil. He therefore suggested that those preparations might be beneficial in leprosy and in tuberculosis by breaking down the resistance of acid-fast bacilli through action on their protective fatty substances.

This observation led me to estimate the amount of serum-lipase in those two diseases. Thanks to the kindness of Dr. E. Muir in sending to me from Calcutta leprous sera in 1923, I was able to show that serum-lipase is much reduced in progressive cases of lepromatous leprosy, and that much the lowest readings were met with just after a reaction. This would be explained if blood-lipase is used up in breaking down lepra bacilli in reacting cases. On the other hand, estimates of serum-lipase gave much higher readings in cases of leprosy which were progressing favourably under chaulmoogra treatment. Dr. Muir confirmed these observations in Calcutta and reported to me: "We are finding almost invariably a very low lipase content in severe reactions, and we are finding a good prognosis justified when there is a high lipase content" of the serum of leprosy patients. Seabra (1946) in South America has reported similar results. Whether that is the true explanation of the action of chaulmoogra preparations or not, the fact remains that they do induce reactions in leprous tissue, accompanied by breaking up and destruction of enormous numbers of lepra bacilli, commonly followed by rapid clinical improvement.

Chaussinand (1947) describes the characters and staining reactions of living and of multiplying lepra bacilli in actively progressing lepromatous cases. He points out the great differences between such living bacilli and those undergoing disintegration and death in the tissues of leprosy patients, whose lesions are clearing under treatment. He describes the latter as showing lightly staining granules within the rods and gradual loss of staining power, with the appearance of chains of granules which disintegrate to form minute dots and then disappear. That is a good description of the bacillary lesions in reacting nodules under chaulmoogra treatment; so his observations confirm my view that chaulmoogra preparations do kill lepra bacilli.

ACTION OF SULPHONES ON LEPRA BACILLI

In summarising several years' experience of promin treatment of leprosy, Faget (1947) states that the gradual disappearance of lepra bacilli indicates a bacteriocidal effect of sulphones. He also points out that febrile reactions no longer develop, which indicates destruction of the lepra bacilli which enter the blood-stream during reactions by means of which the disease is disseminated in untreated progressive cases. Muir (1944) also reported that with diasone given by mouth febrile reactions with new crops of nodules cease to occur. Muir (1947) states that sulphones act by preventing the production of new lesions by dissemination of lepra bacilli through the blood-stream, often accompanied by fever and the very gradual death of organisms in the old lesions. Hence the necessity for 4 or more years' treatment with expensive sulphones in advanced lepromatous cases with masses of bacilli in the thickened skin, which do not appear to be quickly influenced by that class of remedy.

Fite and Gemar (1946) have made histological studies of the regressive tissue changes under promin treatment. They find that the slow improvement is not accompanied by characteristic cellular changes. Those which occur are predominantly atrophic, with extremely slow and gradual lessening of the number of organisms in the lesions to the point of final disappearance, in 10 out of 32 cases examined. These changes did not differ materially from what is seen in spontaneous remission between phases of cellular activity. He concluded: "The important finding is that promin appears to eliminate bacillary infection of the blood-vessels and the blood-stream, thereby preventing the formation of new lesions."

COMPLEMENTARY ACTION OF CHAULMOOGRATES AND SULPHONES

If these conclusions of experienced leprologists are correct, the actions of the two classes of drugs in leprosy appear to be largely complementary. Thus, the chaulmoogrates seem to act by destroying vast numbers of lepra bacilli in nodules and other lesions, especially when pushed or given by the intravenous route, but with some risk that surviving bacilli in the softened reacting lesions may be disseminated through the blood-stream to produce new lesions. On the contrary, sulphones

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exert a very slow action in destroying lepra bacilli in the affected tissues, but with the advantage of lessening the frequency and severity of reactions by destroying any living bacilli which may reach the blood-stream. They should thus counteract the risk of harmful reactions resulting from pushing the more rapidly acting full doses of chaulmoogrates.

The administration of both classes of remedies, especially in advanced lepromatous cases, is therefore indicated; but I advise beginning with several weeks' treatment with a sulphone in such cases to ensure their presence in the blood before pushing chaulmoogrates to the point of producing bacillus-destroying reactions, accompanied by softening of leprous foci, with the possibility of disseminating some living lepra bacilli.

TUBERCULOSIS

The points of resemblance between leprosy and tuberculosis have been pointed out by me (Rogers 1925) and others. They include prevalence in humid climates, causation by resistant acid-fast bacilli, infections chiefly during childhood and adolescence, infection through family and other contacts, and frequent chronicity and lack of response to treatment.

My observation of the destructive effects of injections of chaulmoogrates on lepra bacilli (Rogers 1917–18) naturally led me to try sodium hydnocarpate and sodium morrhuate in tuberculosis. Several favourable reports in small series of cases raised my hopes; but unfortunately neither animal tests by myself in 1920–21 nor further clinical trials proved successful. Their results are summarised in my fourth Croonian lecture of 1924. Extensive trials in pulmonary tuberculosis by Prof. Lyle Cummins and his Welsh colleagues did not show any material benefits, and only limited improvement was obtained in surgical tuberculosis at the Carshalton and Fazakerley children's hospitals, or later in lupus cases.

In 1925 Dr. T. A. Henry and Dr. J. W. Trevan, of the Wellcome Chemical Research Laboratory, made at my request a copper morrhuate, and in 1931 a copper hydnocarpate, for trial in tuberculosis. In 1931 Prof. Lyle Cummins reported to me that the hydnocarpate appeared to produce improvement in all of a few cases in which it was tried; but the results were inconclusive, and I had no clinical material of my own for trials.

Meanwhile Dr. P. Seabra had used a colloid copper morrhuate ('Gadusan') in many tuberculous cases, and Mouzon (1929) summarised the results obtained by South American workers with this preparation. They included successful injection into tuberculous abscesses of glands and bone and in lupus cases as well as in pulmonary tuberculosis.

The following further progress has recently been reported from South America in *Periodical Notes of the Instituto Teraputico Orlando Rangel.* In Year II no. 7 it is recorded that over 10,000 doses of colloidal copper morrhuate have been given intravenously in clinics without a single injurious reaction. Year I no. 2 of the same publication summarises the results from a new technique of Pareja Coronel (1938), in which 10 ml. or more of the colloidal copper-morrhuate solution was injected into the pleural cavity immediately after an artificial pneumothorax in 23 cases of pulmonary tuberculosis. A "typical" case of the series is quoted to show subsidence of fever and all active symptoms, and material gain in weight, accompanied by complete disappearance of very numerous tubercle bacilli from the sputum. The continued success over two decades of this preparation in the hands of South American workers appears to make it worthy of extended trials in other parts of the world, with or without the additional use of such remedies as sulphones, on the same principles as those set forth above in the case of the closely allied leprosy.

CONCLUSIONS

The actions of chaulmoogrates and of sulphones on lepra bacilli are complementary; so a combination of the two is likely to furnish the most effective and rapid treatment of leprosy.

Chaulmoogrates and morrhuates produce focal reactions in tuberculosis, so the colloidal copper morrhuate, or gadusan, of Paulo Seabra might also be worthy of trial in combination with sulphones or with streptomycin in tuberculosis on the same principles as in leprosy.

REFERENCES

Chaussinand, R. (1947) *Ann. Inst. Pasteur*, **73**, 433.
Faget, G. H. (1947) *Int. J. Leprosy*, **15**, 7.
Fite, G. L., Gemar, F. (1946) *Sth. med. J.* **39**, 277.
Mouzon, J. (1929) *Pr. méd.* **37**, 358.
Muir, E. (1944) *Int. J. Leprosy*, **12**, 1.
— (1947) *Leprosy Rev.* **17**, 87.
Pareja Coronel, A. (1938) *Rev. brasil. Tuberc.* **7**, 251.
Rogers, L. (1916a) *Lancet*, i, 288.
— (1916b) *Brit. med. J.* ii, 550.
— (1917–18) *Indian J. med. Res.* **5**, 277.
— (1921) *Practitioner*, **107**, 77.
— (1924) *Lancet*, i, 1297.
— (1925) *Proc. R. Soc. Med.* **19**, 50.
Seabra, P. (1946) *Dis. Chest*, **12**, 550.

NORMAL TEMPERATURES IN OLD AGE

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THERE is a difference of opinion about the normal temperature in old age.

Since the experiments of Davy in 1845, 98·4°F has been taken as the normal adult level. On the Continent, however, 37°C (98·6°F) is accepted. Bard (1941) states that there is a normal diurnal variation of 1·8°F, the lowest temperature being found in the early morning and the highest in the late afternoon.

In a review of temperature changes among the aged, Martsinkovski and Zhorova (1936) cite Barensprung (1851), Charcot (1881), and Landois (1894) to the effect that the aged have a temperature higher than that of normal adults, and Schlesinger (1914) that the internal temperature is maintained at the usual level with slight variations. Cannon (1942) quotes Hirsch (1926) as agreeing with this. His own opinion is the same, "but the limits of adaptation tend to become gradually narrower as one passes through the seventh decade of life." Thewlis (1946) disagrees: "In old age, however, temperature may be below normal."

The present study, designed to test these opinions, tends to support Thewlis.

The first step in the investigation was to take some preliminary readings for exactly ½ min. with a ½ min. thermometer possessing a certificate of accuracy from the National Physical Laboratory. The subjects of the experiment were Chelsea pensioners in the infirmary of the Royal Hospital without any febrile disorder. The readings were begun in July. Several of the temperatures did not reach 95°F, the lowest reading on

TABLE I—MEAN MOUTH TEMPERATURES (°F) BY AGE

Age (years)	No. of persons	1 min.	3 min.	5 min.	Difference
Under 70	4	97·2	97·5	97·7	0·5
70–74	11	96·1	96·9	97·4	1·3
75–79	12	95·6	96·3	96·7	1·1
80–84	4	96·0	96·8	97·0	1·0
Over 85	4	96·5	97·0	97·4	0·9

TABLE II—MEAN AXILLARY TEMPERATURES (°F) BY AGE

Under 70	5	95·3	95·8	96·0	0·7
70–74	11	95·6	96·0	96·5	0·9
75–79	6	96·1	96·9	97·2	1·1
80–84	6	95·6	96·6	96·9	1·3
Over 85	2	95·9	96·1	96·7	0·8

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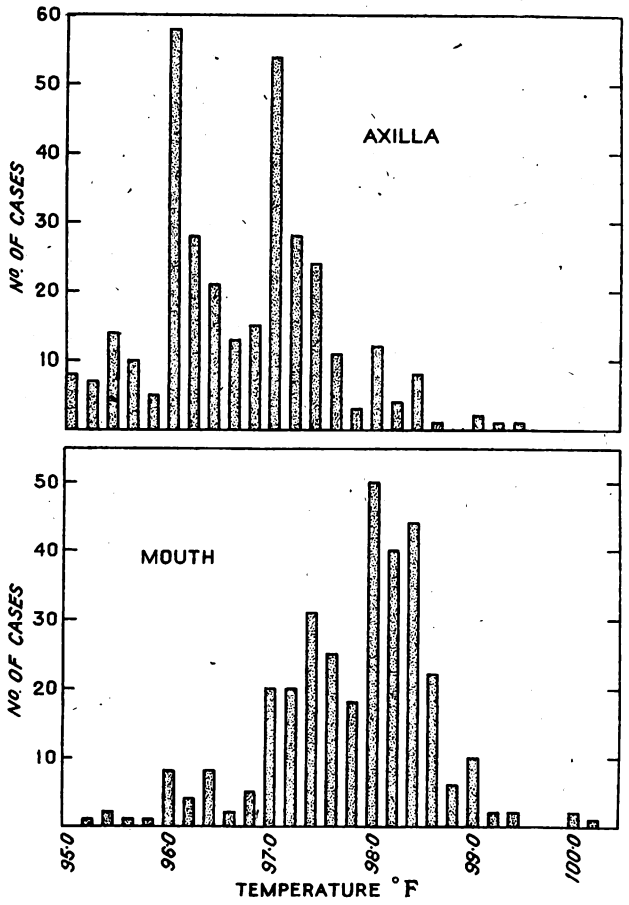
the instrument. These were, however, reckoned as 95° for purposes of calculation of the pilot series. This result was subsequently confirmed in patients in the chronic wards of St. John's Hospital, Battersea, where 25 out of 100 readings registered less than 95°F. These readings were made in October.

Wright (1940) considers that the thermometer should be in place for 10 min. to ensure a correct reading. Few feeble elderly people, however, can hold a thermometer properly in place for more than 5 min. I therefore took successive readings lasting 1, 3, and 5 min. to find out whether the temperature reading was higher when the thermometer was kept in longer. This series of tests was undertaken in 35 pensioners with the thermometer in the mouth, and 30 with it in the axilla. The results were grouped according to age, and the mean figures are shown in tables I and II. As stated above, readings below 95°F have been taken as 95° for the purpose of calculation. This renders the 1 min. results a trifle high, since 6 axillary and 3 mouth temperatures did not register.

Since the 5 min. temperatures were all below the customary standard, it was decided to compare them with a similar series of readings in healthy adults. Consequently, 5 min. temperatures were taken in 50 nurses (male and female) of St. John's Hospital. The mean mouth temperature of these controls was 97·83°F and the mean axillary temperature 97·03°F. The lowest mouth temperature recorded was 95·6°F, and the highest 98·6°F. The lowest axillary reading was 95·0°F, and the highest also 98·6°F. The range in the mouth, therefore, was 3° and in the axilla 3·6°.

In view of these findings it was decided to measure the 5 min. temperatures of a larger number of healthy Chelsea pensioners simultaneously in mouth and axilla.



Temperature ranges in axilla and in mouth in Chelsea pensioners.

All the men in this series were aged more than 65, the oldest being 91. Each one was ambulant, and none was in need of any medical treatment. All cases of illness were excluded. The readings were taken during nearly a year, 12 men being examined every week. The experiment formed part of a larger investigation into normal variations of temperature, pulse-rate, blood-pressure, arterial thickening, and other physical signs commonly found in old age. The men were always examined between 10.30 and 11.30 A.M. as part of the routine weekly medical inspection of the fit and healthy pensioners. They had always had a period of rest before examination.

Among the 326 old men considerable variations were found in the temperature readings of mouth and axilla.

TABLE III—MEAN 5 MIN. TEMPERATURES (°F) BY AGE-GROUPS

Age (years)	No. of persons	Mouth	Axilla
65–69	36	98·0	96·9
70–74	146	97·8	96·6
75–79	81	97·9	96·7
80–84	40	97·7	96·6
85–89	20	97·7	96·6
90–95	3	96·9	96·3
Total	326	..	..

The mouth temperatures showed a range of 5°, from 95·2°F to 100·2°F; and the axillary temperatures varied from 95·0°F to 99·4°F—a range of 4·4° (see figure). The mean temperatures for the five-year age-groups were calculated for comparison with the results shown in tables I and II, and are shown in table III. Taken all together, the temperatures were somewhat lower than those found in normal adults and below those found in the previous control series.

It was felt, however, that the final figures for all 326 old men would be a truer picture of the real normal findings in old age.

MOUTH TEMPERATURES (°F)

	Mean	S.E. of mean	Min.	Max.	Range
Controls	97·83	0·10	95·6	98·6	3
Series	97·81	0·04	95·2	100·2	5

AXILLARY TEMPERATURES (°F)

	Mean	S.E. of mean	Min.	Max.	Range
Controls	97·03	0·12	95·0	98·6	3·6
Series	96·67	0·04	95·0	99·4	4·4

Findings in 50 nurses and in 326 old men.

It will be seen that the arithmetic mean thus calculated was 97·81°F in the mouth and 96·67°F in the axilla. The median reading of the series was 98·0°F in the mouth and 96·8°F in the axilla. The mode was the same as the median in the mouth, but 96·0° in the axilla (see figure). The maximal oral deviation was −2·6° in a man of 73, and the axilla showed +2·7° in a pensioner aged 70. The mean deviation was ±0·6° in the mouth and ±0·7° in the axilla. The variance was the same as the mean deviation in each case, which gave a standard deviation of 0·8° in the mouth and 0·8° in the axilla. I have not been able to find any similar set of figures for comparison.

SUMMARY

In old age, mouth and axillary temperatures taken for half a minute only are not accurate readings.

Few old people can retain a thermometer in place for more than 5 minutes.

In old age the range of normal temperature is greater than in earlier life.

Part of this work was carried out while I was receiving a research grant from the Nuffield Foundation. Thanks are due to Sister May and Sister Williams, of the Royal Hospital, Chelsea, for their help; the nurses of St. John's Hospital, S.W.11; and Mr. J. A. Heady for his help with the statistics.

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TREATMENT OF ANGINA OF EFFORT WITH ANDROGENS

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Edwards et al. (1939) observed that castrated men had a deficient cutaneous blood-supply, which was improved by the administration of testosterone. A similar improvement was observed in thrombo-angiitis obliterans. It was hoped that improvement might be produced also in the coronary circulation by vasodilatation, and that a collateral circulation might develop.

Encouraging reports of the treatment of angina of effort with testosterone were given by Lesser (1942, 1943, 1946), Strong and Wallace (1944), Sigler and Tulgan (1943), and others. Levine and Likoff (1943) reported on the treatment of 19 patients; they noted improvement in 5 only, and 2 of these soon reverted to their former state.

I have studied 67 cases, 58 in men and 9 in women. Only patients with a classical history of angina, in whom there could be little doubt about the diagnosis, were selected for observation. All were asked to note the distances they could walk without getting anginal pain; each patient was seen two or three times before testosterone was given, to ensure that he could assess his exercise tolerance with reasonable accuracy. A routine clinical examination was made in all cases, together with electrocardiography and chest radiography.

Many of these patients were already being treated with nitroglycerin, sedatives, and rest; but all such therapy was stopped before testosterone was given. A standard course of treatment consisting of injections of testosterone propionate 25 mg. thrice weekly for six weeks was given to all the patients. To evaluate psychological reactions to injections a control group of 12 patients were given injections of sesame oil and the effects were noted. The patients' ages varied from 43 to 74 years, and the duration of the disease varied from 3 months to $3^1/_2$ years. All the patients were observed for six months, 44 of them for twelve to eighteen months.

There was no quick response to testosterone therapy in any of the cases; usually about 8–10 injections had been given before improvement was noted. Considerable improvement in the frequency and the severity of anginal attacks and in exercise tolerance was reported by 9 patients at the end of the treatment; but this improvement was short-lived, and their condition reverted within a few months to what it had been before treatment was begun. In 34 other cases the patients reported improvement in their condition about the end of the fourth week of treatment, but their improvement was not striking and relapse took place within three months of the end of treatment. No improvement was reported by any of the remaining 24 patients. On the other hand, of the control group of 12 patients treated with sesame oil, 5 reported improvement.

Electrocardiography.—Changes in the electrocardiogram had been noted in 27 out of the 67 patients observed. They were unaffected by treatment with testosterone.

Hypertension.—A significant fall in systolic blood-pressure was observed by Steinach et al. (1938) in 31 out of 49 patients after treatment with androgens. Greene (1938) was unable to confirm this. In the present series blood-pressure measurements were recorded before and after treatment with testosterone propionate, and in no case was a significant fall in blood-pressure observed.

Size of Heart.—Radiograms were taken in every case before treatment was begun, and repeat films were taken in 20 cases. No changes in the size of heart were observed after the treatment.

SUMMARY

A series of 67 patients with angina of effort were treated with injections of testosterone propionate. Good temporary improvement was noted in 9 cases, and a lesser degree in 24 cases. No improvement could be discerned three months after the end of treatment.

REFERENCES

Edwards, E. A., Hamilton, J. B., Duntley, S. Q. (1939) *New Engl. J. Med.* **220**, 865.
Greene, R. (1938) *Lancet*, ii, 79.
Lesser, M. A. (1942) *New Engl. J. Med.* **226**, 51.
— (1943) *Ibid*, **228**, 185.
— (1946) *J. clin. Endocrinol.* **6**, 549.
Levine, S. A., Likoff, W. B. (1943) *New Engl. J. Med.* **229**, 770.
Sigler, L. H., Tulgan, J. (1943) *N.Y. St. J. Med.* **43**, 1424.
Steinach, E., Peczenik, O., Kun, H. (1938) *Wien. klin. Wschr.* **51**, 65.
Strong, G. F., Wallace, A. W. (1944) *Canad. med. Ass. J.* **50**, 30.

Preliminary Communication

TETRA-ETHYLPYROPHOSPHATE IN MYASTHENIA GRAVIS

THE pharmacological actions of the condensed alkylphosphate, tetra-ethylpyrophosphate (T.E.P.P.), were recently described by Burgen and his colleagues.[1] This substance is a powerful anticholinesterase, and its actions closely resemble those of eserine and 'Prostigmin' but differ in some respects from those of di-isopropylfluorophosphonate (D.F.P.). In experiments on rats Burgen [2] has shown that T.E.P.P. is as potent as eserine and about a third as potent as prostigmin. The actions of eserine and prostigmin last for 2–3 hours after administration, those of T.E.P.P. for 24–48 hours, and those of D.F.P. for up to 7 days. When given by mouth T.E.P.P. is well absorbed. Its actions in myasthenia gravis are therefore of great interest.

We report here observations on three patients with myasthenia gravis to whom T.E.P.P. has been administered; two had previously been treated with prostigmin, while the third was a new case. Tests for muscular power have been performed as follows:

(1) *The maximal force of contraction* of hand and forearm muscles has been recorded with a rubber bulb connected to a pressure gauge reading in lb. per sq. in.

(2) *The duration of sustained contraction* has been measured with an apparatus in which pressure from the contraction of hand and forearm muscles is applied to a spring balance with a tension of 4 lb.; the readings then show how long the patient can maintain a contraction pressure of 4 lb.

During these studies atropine has been given as required to prevent the visceral side-effects of T.E.P.P.

Case 1.—An unmarried woman, aged 42, developed myasthenia gravis in 1929. Since 1931 she has been admitted to the Middlesex Hospital eight times. Initially she was treated with ephedrine and improved slightly. In February, 1935, she was given prostigmin with considerably more benefit. During the past 12 years the dose of prostigmin has had to be gradually increased. Since 1945 her condition has slightly worsened. Early in 1946 she was treated by radiotherapy (3430r) to the mediastinum; improvement followed, and for a time the dose of prostigmin was halved. However, by August, 1947, all her symptoms had become more severe, including ptosis, double vision, difficulty in mastication and swallowing, drooping of the lower lip and jaw, generalised fatigue, and breathlessness on exertion. A further increase

1. Burgen, A. S. V., Keele, C. A., Chennels, M., del Castillo, J., Floyd, W. F., Slome, D., Wright, S. *Nature, Lond.* 1947, **160**, 760.
2. Not yet published.

DR. HOWELL: REFERENCES

Bard, P. (1941) Macleod's Physiology in Modern Medicine. 9th ed., London.
Cannon, W. (1942) in Cowdry's Problems of Ageing. 2nd ed., Baltimore.
Davy, J. (1845) *Philos. Trans.* p. 319.
Martsinkovski, B. I., Zhorova, K. S. (1936) *Acta med. scand.* **90**, 582.
Thewlis, M. W. (1946) The Care of the Aged. 5th ed., London.
Wright, S. (1940) Applied Physiology. 7th ed., London.

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in prostigmin dosage was necessary. The patient was readmitted in January, 1948, for treatment with T.E.P.P.

Fig. 1 compares the effects on muscular power of single intramuscular injections of 1·25 mg. of prostigmin and of 2 mg. and 3 mg. of T.E.P.P. In this patient a single injection of T.E.P.P. was about half as potent as prostigmin; the peak effect occurred later with T.E.P.P. and the action lasted longer. The patient was then given T.E.P.P. as a therapeutic substitute for prostigmin. The final daily dosage scheme for T.E.P.P., compared with the previous prostigmin régime, was as follows:

Prostigmin	T.E.P.P.
7 A.M.: 15 mg. by mouth	
7.30 A.M.: 1·25 mg. subcutaneously	7.30 A.M.: 4 mg. by mouth
10 A.M.: 30 mg. by mouth	
12.45 P.M.: 1·25 mg. subcutaneously	12.30 P.M.: 4 mg. by mouth
3 P.M.: 30 mg. by mouth	
4.45 P.M.: 0·65 mg. subcutaneously	
6 P.M.: 15 mg. by mouth	7 P.M.: 2–4 mg. by mouth
8 P.M.: 0·65 mg. subcutaneously	
10 P.M.: 15 mg. by mouth	
Total Daily Dosage	
3·80 mg. subcutaneously 105 mg. by mouth	10–12 mg. by mouth

With prostigmin the patient was too weak on waking to give herself an injection until the first oral dose had taken effect. The action of T.E.P.P. was found to be cumulative; and, when the correct dosage was established, the beneficial effect on muscular power was more constant than with prostigmin. This may be illustrated by the following findings (right hand) 5 hours after administration:

Prostigmin 1·25 mg. intramuscularly		*T.E.P.P. 4 mg. by mouth*	
Maximum contraction	*Duration of contraction*	*Maximum contraction*	*Duration of contraction*
8·0 lb. per sq. in.	6 sec.	10·8 lb. per sq. in.	66 sec.

The more even action of T.E.P.P. was also well shown by the clinical response, particularly by the striking improvement in muscular power on waking in the morning. With T.E.P.P. there was never any difficulty in swallowing and no weakness of respiratory muscles, and the tone of all the facial muscles was much more satisfactory than with prostigmin. The patient definitely prefers T.E.P.P. to prostigmin and has been treated solely with T.E.P.P. for 7 weeks.

Case 2.—A man, aged 52, was operated on in October, 1944, in the Middlesex Hospital for a perforated duodenal ulcer. In February, 1946, he noted double vision, drooping

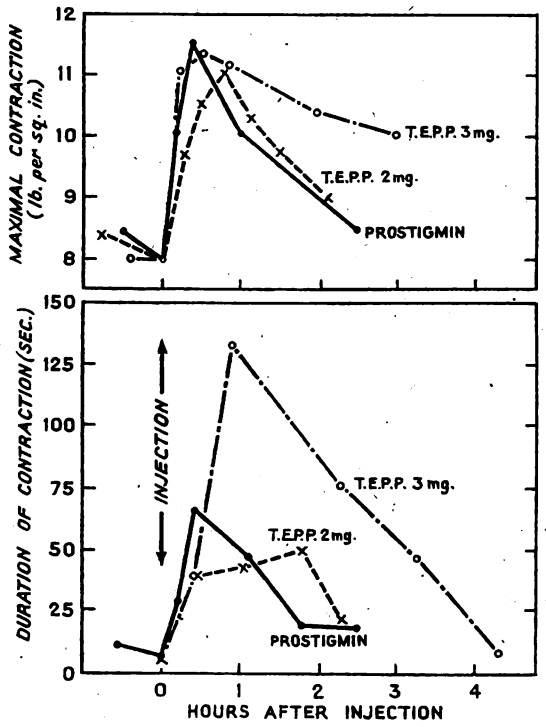

Fig. 1—Effects of prostigmin 1·25 mg. and T.E.P.P. 2 and 3 mg. on maximal force of contraction and duration of sustained contraction of right-hand and forearm muscles in case 1.

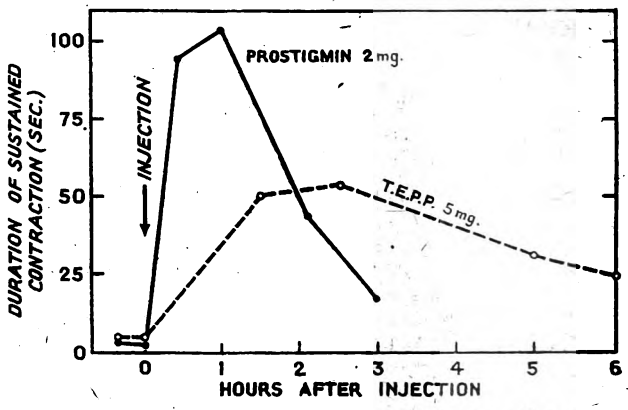

Fig. 2—Effects of prostigmin 2 mg. and T.E.P.P. 5 mg. on duration of sustained contraction of left-hand and forearm muscles in case 3.

of the right eyelid, a change in his voice, and weakness of his lips, all these symptoms being worse towards the end of the day. In April, 1946, he was readmitted to the Middlesex Hospital. The positive findings were right-sided ptosis, variable diplopia, weakness of orbicularis oculi muscles and to a lesser extent of circumoral muscles, nasal intonation to the voice after talking for some time, and abnormal fatigability in all skeletal muscles. He responded well to prostigmin; but, despite the addition of atropine, pylorospasm became so severe that the dose of prostigmin had to be reduced below the effective range. In August, 1946, a partial gastrectomy was performed, after which normal doses of prostigmin were tolerated. Nevertheless his condition deteriorated, swallowing and breathing being at times difficult. In January, 1947, he was referred to Mr. Geoffrey Keynes for thymectomy. At operation a thymoma was removed. The response to operation was at first satisfactory, and the dose of prostigmin was temporarily reduced to 15 mg. thrice daily; but within 2 months the dose had risen to 105 mg. daily. In May, 1947, during a spell of hot weather, he had a severe relapse and was readmitted. He was given a course of radiotherapy (6850r) and was discharged improved. Despite regular treatment with prostigmin, he noted weakness of his voice, dropping of the jaw, and general fatigue, especially towards evening. At night he was subject to attacks of weakness of the muscles of respiration.

He was admitted once more on Jan. 25, 1948. The effects of T.E.P.P. are best summarised by comparing the dosage of prostigmin previously taken with the stabilised dosage of T.E.P.P.:

Prostigmin (by mouth)	T.E.P.P. (*by mouth*)
6 A.M.: 15 mg.	
9 A.M.: 15 mg.	
11.30 A.M.: 15 mg.	6.30 A.M.: 5 mg.
2.30 P.M.: 15 mg.	
5.30 P.M.: 15 mg.	5.30 P.M.: 5 mg.
9 P.M.: 15 mg.	
12 (midnight): 15 mg.	
Total dose = 105 mg.	Total dose = 10 mg.

The dose of prostigmin at 5.30 P.M. was barely sufficient to enable him to eat his supper at 6 P.M. As with the other patients, the effects of T.E.P.P. were much more even throughout the day than those of prostigmin. The patient has been treated solely with T.E.P.P. for 6 weeks. He can now eat his supper in comfort and can talk for longer periods without fatigue. When taking prostigmin he was incapable of whistling in the cat at night, but on T.E.P.P. he can do so! His sleep is no longer disturbed by difficulty in breathing.

Case 3.—An unmarried woman civil servant, aged 48, developed double vision on Aug. 1, 1947, when on holiday, and this symptom persisted. By the end of September her legs felt weak after walking some distance. When examined on Oct. 10 the positive findings were slight left ptosis and diplopia below the horizontal. In December she observed weakness and easily induced fatigue in the arms, and a tendency for both eyelids to droop at night. On Jan. 13, 1948, she was admitted to the Middlesex Hospital. She now showed bilateral ptosis, the degree of which was definitely related to fatigue, with a compensatory over-reaction of the frontalis muscle. There was a partial external ophthalmoplegia, upward movement being particularly affected. There was much weakness of both orbicularis oculi muscles, but the

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lower facial muscles were normal, as were mastication, speech, and swallowing. The muscles of the limbs became easily tired. There was no evidence of thyrotoxicosis. Radiography of the anterior mediastinum was negative. The patient reacted well to prostigmin.

The effects on duration of sustained muscular contraction of intramuscular injections of 2·0 mg. of prostigmin and 5·0 mg. of T.E.P.P. are compared in fig. 2. The peak action of T.E.P.P. is smaller and later than that of prostigmin, but the action of T.E.P.P. lasts longer.

This patient was stabilised on T.E.P.P. 6 mg. by mouth at 6.30 A.M. and 3 P.M., making 12 mg. daily. A very even action was maintained throughout the day, ptosis was abolished, muscular power in the hands was much improved, and the patient could do light work in the hospital ward without undue fatigue. Four weeks after T.E.P.P. was started she was allowed to "run down" by stopping the drug. The following effects on the duration of sustained muscular contraction (left hand) were recorded:

	Duration of contraction
3 hr. after last 6 mg. dose of T.E.P.P. ..	80 sec.
24–36 hr. " " " ..	14–28 sec.
56 hr. " " " ..	5 sec.

At 56 hr. she was very feeble, ptosis was severe, and there was respiratory weakness. This response shows that the effects of T.E.P.P. lasted for at least 48 hr., compared with 4–6 hr. for prostigmin in this patient. She has now been treated with T.E.P.P. for 6 weeks.

SIDE-EFFECTS

The visceral and central side-effects of T.E.P.P. are similar to those of prostigmin. The most prominent visceral action was on the gut, producing colic and diarrhœa. This action was as effectively prevented by atropine as the intestinal stimulation produced by prostigmin.

Central side-effects, produced in all three patients during the process of dose stabilisation, included vertigo, nystagmus, pallor, sweating, nausea, vomiting, and muscular twitching. When central side actions developed with T.E.P.P., muscular power was well maintained for the next 24–36 hours without further dosage.

TECHNIQUE OF ADMINISTRATION

T.E.P.P. is a colourless oil, sp. gr. 1·2. For intramuscular injection a 0·5% solution in propylene glycol was used. For administration by mouth a 2% or 5% solution in propylene glycol was made; a calibrated dropper was then used to measure the correct dose into 1–2 fl. oz. of water, which was swallowed immediately. This mode of prescribing and administration is necessary owing to the rapid inactivation of T.E.P.P. in the presence of water. The production of a more convenient preparation for administration by mouth is being investigated.

SUMMARY AND CONCLUSIONS

The actions of tetra-ethylpyrophosphate (T.E.P.P.) have been studied in three patients with myasthenia gravis.

The drug was a completely effective substitute for prostigmin in these patients.

In single doses, by injection, T.E.P.P. is from a third to a half as potent as prostigmin, but its action lasts about twice as long.

T.E.P.P. is more cumulative than prostigmin, but less so than di-isopropylfluorophosphonate (D.F.P.). Owing to its cumulative effect the action of T.E.P.P. is much more even than that of prostigmin.

T.E.P.P. is effective by mouth; 10 mg. of T.E.P.P. by mouth daily is equivalent to 100–150 mg. of prostigmin given by mouth.

The maintenance dose of T.E.P.P. has ranged from 8 to 12 mg. daily, given in two or three doses by mouth.

The central and visceral side-effects of T.E.P.P. are similar to those of prostigmin. The visceral actions can be prevented with atropine.

We are very grateful to Mr. B. Topley for help with the chemical aspects of T.E.P.P., and to Messrs. Albright & Wilson Ltd. for supplies of this substance.

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Reviews of Books

Progress in Clinical Medicine

Editors: RAYMOND DALEY, M.A., M.D. Camb., M.R.C.P., first assistant, cardiological department, St. Thomas's Hospital, London; HENRY G. MILLER, M.D., M.R.C.P., D.P.M., assistant physician, Royal Victoria Infirmary, Newcastle-on-Tyne. London: J. & A. Churchill. 1948. Pp. 356. 21*s.*

THIS is a symposium by twelve physicians, and may perhaps be regarded as a clinical counterpart to the same publisher's *Recent Advances in Medicine*—though how far it is wise to separate clinical from laboratory or experimental work in such a book may be open to argument.

Dr. G. A. Smart contributes a full chapter on metabolic disorders, including a useful summarised account of the vitamins; but his black-and-white photographs are disappointing, as is inevitable when such a thing as the sprue tongue is illustrated without colour. Progress in chronic rheumatic joint diseases does not make exhilarating reading, but the slow advance of this subject is to blame rather than the author. A useful page or two is given to the use of gold salts, which he advocates in the form of small doses weekly and only after "routine measures" have been given a fair initial trial. The advice on how to deal with a case of suspected rheumatoid arthritis shows little that is new, and in the section on this important condition the presence of only one reference later than 1938 is a sad commentary on the progress here. A good account of the anæmias and non-tropical splenomegalies makes even the rhesus factor understandable. Is it perhaps an indication of the speed of modern developments that urethane in treatment is mentioned only in a few words, implying that the reader already knows about its uses and drawbacks? It is good to see a chapter on psychosomatic medicine, and elsewhere in the book the reader will find up-to-date information on such things as thrombophlebitis and the use of heparin, thiocyanates in hypertension, streptomycin, thiouracil, and 'Paludrine' in malaria. Dr. Emanuel Miller on the nervous system, Dr. M. C. G. Israëls on diseases of the blood, and Dr. Joseph Smart on diseases of the chest deserve special mention. Where much new work in different aspects of medicine is still unsifted, more of the personal opinions of the authors would be helpful; it is sometimes hard to judge values from accounts of papers written and reviews of work done. But this book certainly deserves a wide public and a generous welcome.

Textbook of General Surgery

(5th ed.) WARREN H. COLE, M.D., F.A.C.S., professor of surgery, University of Illinois; ROBERT ELMAN, M.D., F.A.C.S., professor of clinical surgery, Washington University. New York: D. Appleton-Century Co. 1948. Pp. 1160. $11.

THIS fine textbook, written for undergraduate students, owes much of the sustained excellence of its text to a system whereby a panel of distinguished surgeons, some of world renown, act as consulting authors. To each is submitted an appropriate section of the book for approval and amendment. In this way Warren Cole and Robert Elman, the executive authors, have achieved the best of two worlds—balance and uniformity of expression, and authoritative opinion in every branch of surgery. This edition contains new chapters on surgical convalescence, and on the surgery of warfare, the latter written by Frank B. Berry. But the authors have wisely tempered with a conservative outlook their desire to incorporate all that is new.

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Child Guidance

WILLIAM MOODIE, M.D., F.R.C.P., D.P.M., medical director, London Child Guidance Training Centre. London: Cassell. 1948. Pp. 48. 4s. 6d.

Dr. Moodie's dry memorable style makes any book of his worth reading. This little work, addressed to general practitioners, sets out the purposes and methods of child guidance. The advice on management of parents is a particularly useful guide to those whose sympathy for the victim of parental mismanagement outruns their discretion.

> "They come," he says, "filled with doubts as to where they have gone wrong, and guilty feelings of their failure as parents, and any reproof will merely make this worse and permanently wreck any chance of coöperation."

Parents must be allowed to talk out worries and regrets with as few comments and interruptions as possible, and the initiative for changing the family situation must come from them. All this takes time, and it is time well spent. Dr. Moodie remembers always that in child guidance, as in other forms of psychiatry, success often turns on the personal equation: "some psychiatrists do better work with adolescents, others with young children, and there are social workers who get on more easily with fathers than with mothers." His book is a stable one, which will appeal to stable people; indeed, he shows undue excitement on only one topic—that of criminal responsibility. It would be contrary to the common good of all, he thinks, if all crime came to be looked on as mental illness. "The dignity and authority of law and order would be replaced by the uncritical friendliness of the consulting room, and crime would flourish in encouragement."

Calcific Disease of the Aortic Valve

H. T. KARSNER, M.D.; S. KOLETSKY, M.D., Institute of Pathology, Western Reserve University, Cleveland, Ohio. Philadelphia and London: J. B. Lippincott. 1947. Pp. 111. 30s.

THIS is mainly a pathological study of 200 hearts showing, at necropsy, disease of the aortic valve with calcification. Many of them showed lesions elsewhere in the heart—especially in the mitral valve but also in the left auricle, tricuspid valve, and pericardium—which grossly and microscopically were of rheumatic type. In one group in which the disease of the aortic valve was the sole gross lesion—i.e., about half the total—microscopical examination, both of the valve itself and of other parts of the heart, suggested a chronic inflammatory change due to rheumatism. It is claimed that with 4 exceptions the findings indicate a rheumatic ætiology for all the 200 cases of calcific disease of the aortic valve. Four-fifths of the patients were aged fifty or more and the ratio of males to females was 1·6 : 1. The clinical features are given though these were not the observations of the authors and did not receive the same careful attention as the pathology, but it is instructive to note how often the lesion escaped diagnosis clinically and how rarely the classical signs of aortic stenosis were present. Karsner and Koletsky's careful work will give impetus to the view which has been steadily gaining ground since Mönckeberg's publication in 1904, that calcific aortic-valve disease is usually if not always rheumatic in origin, and conversely, rarely or never degenerative.

Progress in Gynecology

Editor: J. V. MEIGS, M.D., clinical professor of gynecology, Harvard medical school; SOMERS H. STURGIS, M.D., chief of the Vincent Memorial Hospital Laboratory, assistant surgeon, Massachusetts General Hospital. London: W. Heinemann. 1947. Pp. 552. 35s.

THE preface says that the purpose of this book is to refresh and bring up to date those medical men who have spent the last years in the Forces; but its 70 sections cover most of the subject, irrespective of whether any recent advance in our knowledge has occurred or not. The authors thus give us a mixed dish: some spoonfuls are delicious—others by no means so palatable. The appetite is whetted by the first two sections—on embryology, by Schiller, and on congenital abnormalities, by Novak—and the interest is maintained by a description of the morphological and endocrine basis for menstrual bleeding (J. E. Maikee). Thereafter the nutriment has to be searched for among a good deal of tasteless material. For example, dysmenorrhœa has less than four pages, and the reader is driven to conclude that ultimately most of the patients suffering from this complaint will have to be treated by lumbar sympathectomy. The section on trichomonas infection of the vagina in virgins, and the two small articles on benign and malignant tumours of the ovary, could well have been omitted.

The last section deals well with recent advances in operations and their technique. Multiple authorship, however, leads to divergent advice, and more ruthless editing would produce a more useful, if smaller, volume. At present the work cannot compare with its British equivalent in the "Recent Advances" series.

Die Klinik der Energetisch-dynamischen Herzinsuffizienz

Dr. ROBERT HEGGLIN, Privatdozent, University of Zurich. Basle and New York: S. Karger. 1947. Pp. 120. Sw. fr. 19.

Dr. Hegglin records many observations on animals and in the clinic to show that a special type of myocardial weakness, distinct from that of congestive failure, occurs in severe metabolic disturbances. The myocardial injury is revealed by alterations in the duration of electrical systole (as compared with average normal calculated by a formula) which is usually lengthened, and of the mechanical systole which is usually shortened. These changes are found especially in diabetic coma, insulin shock, infections, liver and kidney disease, and endocrine disturbances, and it is claimed that a prognosis can be based on their progression or regression. The records reproduced illustrate the author's point clearly in many cases, though in others it seems that the onset of the second sound and the end of the T-wave are arbitrarily determined. The statement, in a very brief consideration of therapy, that digitalis may be of use in these toxic and infective conditions with neither congestive failure nor an abnormal rhythm cannot be accepted.

Medizinische Terminologie (Basle: Schwabe. 1948. Fr. 32).—In this comprehensive German dictionary Dr. Rudolf Abderhalden defines words and terms current not only in medicine but also in the allied sciences. The lay-out is similar to that of more than one American dictionary; especially welcome are the capital letters allotted to proper names and the biographical index which gives a clue to their owners.

Essentials of General Anæsthesia (4th ed. Oxford: Blackwell's Scientific Publications. 1947. Pp. 348. 30s.).—This well-illustrated textbook gives a full and very clear account of the practice, together with the underlying principles, of general anæsthesia. Besides making other minor changes and additions, Prof. R. R. Macintosh and Dr. Freda B. Bannister have enlarged the section on intravenous anæsthesia, and completely revised the chapter on endotracheal anæsthesia, the mechanics of laryngoscopy being now well demonstrated. Trichlorethylene is included in the text, but in view of the work of the Madison school the statement that there is no special danger to the heart from trilene is open to question.

Breathing in Irrespirable Atmospheres (London: Saint Catherine Press. 1947. Pp. 373. 25s.).—The greater part of this book on respiratory apparatus, by Sir Robert Davis, managing director of Messrs. Siebe Gorman, the diving experts, was, he explains, already in the press before the war; so there are no descriptions of war-time developments. Sir Robert confines himself to the limits set by the title: diving appliances and the related problems are only mentioned in passing; for example, oxygen poisoning and the use of helium in deep diving get only cursory mention. Sections on the history of chemical warfare from the earliest times, and on the experiences of early balloonists, are amusing; but the book as a whole is poorly written, and the physiological treatment is weak. Anyone who wants a respiratory apparatus will find something suitable among the illustrations of every type ever made by Siebe Gorman; but the relative advantages of different types are not discussed.

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THE LANCET

LONDON: SATURDAY, APRIL 3, 1948

Health Centres Now

OF all the ideas brought forward during the stages of discussion, persuasion, and preparation for the health service, the one that most captured the imagination of the public and of doctors was that of group practice from health centres. First bruited by the Medical Planning Commission, this idea was expanded in the Coalition white-paper and given prominence in the Act itself. To many the promised reorientation of general practice was the chief reason for thinking that the new service would provide something better than a mere extension of National Health Insurance. It is the more depressing, therefore, to find that, with the appointed day relentlessly approaching, health centres show signs of disappearing over the horizon. The Minister of Health's circular to health authorities "for action" (or rather, for inaction) goes so far as to discourage the initiative of any authority which, aware of local needs and of local potential, is endeavouring to foster in its own area this modern concept of medical practice.

We all recognise how difficult these days have become. We are well aware of the need for diverting man-power and materials to the most urgent national needs. None would deny that houses are needed, and more urgently needed than health centres. Regretfully but unreservedly, we can accept the Minister's dictum that no general construction of health centres can at present be undertaken. But the only alternative he himself sees to such a programme is the adaptation or conversion of existing buildings—an approach which, as he says, carries a risk of disappointing results which would prejudice the whole idea from the start. Is this really the only alternative? Would it not be possible even now to produce enough prototypes, of ranging capacity and design, to ensure that the months and years shall not be wasted and the inspiration lost? There are areas where new building will be imperatively needed even in the days immediately ahead. The blitzed towns are being rebuilt, new housing estates are projected, and satellite towns are on the stocks. In the fullness of time all these schemes will house their contingents; more people will dwell in the old towns and new ones will arise. The enlarged communities will need an enlarged medical service, and new doctors coming to provide this service must be given somewhere to live and to work. Does this not offer the ideal opportunity for early establishment of health centres? Some labour and material would have to be diverted from housing for this purpose, but it would be labour and material well used, and likely to pay good dividends in terms of good health, contentedness, and encouragement to the community so served, to say nothing of the value of a field experiment in advance of the wider programme for which we hope. Mr. BEVAN contemplates setting up a committee, in collaboration with the Central Health Services Council, to give "expert guidance on the best kinds and purposes of health centres at which development should aim." But an ounce of practice is worth a pound of precept, and the daily problems encountered and solved in a few working health centres during the lean years would teach far more, and eventually save far more, in time and money and effort, than any amount of expert theorising.

Fortunately, though the Minister's circular provides local health authorities with a perfect excuse for doing nothing, it does not prevent action where circumstances are particularly favourable to experiment. Since it "is not meant to rule out of consideration proposals which, despite the building stringency, the local health authority, after consultation with the executive council and other interests concerned, regard as particularly urgent," it permits insistent presentation of schemes which could be immediately practicable and valuable locally, and by their example might also be of national consequence. We trust that medical representatives on executive councils will not be backward in their perception and acceptance of openings that may appear in their areas. There will, we are sure, be no lack of enthusiasm for such schemes wherever they can be initiated; for increasingly we hear reports of spontaneous and successful experiments in group practice undertaken by doctors in widely different and widely separate districts. One such report we publish this week, giving an account of the first year's working of a group of eight partners and their three assistants in a busy industrial town. We regard this as a particularly valuable contribution of experience, showing how much can be achieved by coöperation and by the shared use of ancillary help, even in the absence of a centre specially designed to serve as a focus and incentive for the work of the group. Experience of this kind enables us to retain our confidence that the advantages of group coöperation so outweigh its disadvantages that the slackening of financial bonds under the new Act will not be found to disrupt many present partnerships, or prevent future amalgamation of practices. But we still think it unlikely that the most satisfactory conditions of work will be attained until the groups have the use of special centres; and common sense demands that these should be designed, equipped, and managed in the light of experience gained in prototypes.

Much thought was given to the problem of health centres by Lord DAWSON'S committee in the early 'twenties; but the plans which received this detailed consideration were by economic pressure forced into pigeon-holes from which (as historic documents) they have only lately emerged. If history is not to be repeated, and if the renaissance of general practice is not again to be postponed for another generation or more, we need our first health centres now. A beginning cannot be made too soon.

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Chemotherapy of Leprosy

OF the many remedies for leprosy advocated over the centuries only the oils of species of hydnocarpus have consistently maintained their reputation up to the present day. They were originally given by mouth or inunction, and later a change was made to intramuscular, intravenous, or subcutaneous administration, but in the last few years intradermal infiltration into the actual lesions has been almost exclusively used. The original crude chaulmoogra oils have now been largely superseded by purified oils, their ethyl esters, and salts of their fatty acids, variously modified. In this issue Sir LEONARD ROGERS recalls some of his important earlier work on the treatment of leprosy with these drugs. The specificity of the chaulmoogra preparations in leprotic infection is questionable. Sir LEONARD ROGERS believes that they actually destroy leprosy bacilli within the lesions; but the evidence that they are bacteriolytic is slight, and it is more probable that any action they exert results from counterirritation and the stimulation of a tissue response. In some cases the course of lepromatous leprosy appears to be modified by long-continued treatment with chaulmoogra, but in others there is no obvious benefit. When chaulmoogra was the only drug available, the drug treatment of leprosy was therefore unsatisfactory in the extreme.

In the last seven years the introduction of the sulphones has substantially changed the outlook. In 1908 FROMM and WITTMAN [1] prepared 4 : 4′ diaminodiphenylsulphone, and in 1939 RIST [2] reported that this drug inhibited the growth in vitro of human and avian tubercle bacilli; a year later he and his co-workers [3] showed that it modified the course of avian tuberculous infections in rabbits. However, this sulphone, unfortunately, is relatively insoluble and too toxic for human use. In 1943 Faget et al. [4] reported the trial of 'Promanide' (known as 'Promin' in the U.S.A.), or *p,p′*-diaminodiphenylsulphone-N, N′-didextrosesulphonate, a more soluble compound, in leprosy. This drug proved unduly toxic by mouth but could be given intravenously in doses of 5 g. daily, in some cases for long periods. The results were most encouraging: the disease was apparently arrested and actual regression of lesions was seen; seldom, if ever, did the disease progress further while under treatment over several years. In 1944 MUIR [5] described his results with 'Diasone,' disodium formaldehyde-sulphoxylate diaminodiphenylsulphone, in lepromatous leprosy in the West Indies. It was less toxic by mouth than promanide and could be given in tablet form in doses up to 2 g. daily for many months. As with promanide, clinical arrest or regression of the active manifestations of lepromatous leprosy attended its use. Other sulphone preparations are under investigation, notably 'Promizole,' 4,2′-diaminophenyl-5′-thiazolylsulphone, and 'Sulphetrone,' 4 : 4′-bis (γ-phenyl-*n*-propylamino) diphenylsulphone-tetrasodium sulphonate. The relative value of these various sulphones will emerge in due course, but the parent radical, common to all, appears to be the active therapeutic agent. In an extremely chronic disease like leprosy, characterised by spontaneous remission and exacerbation, years must elapse before any claim to cure can be established. Furthermore, treatment with the sulphones is not free from side-effects. Gastro-intestinal disturbances, hæmolytic anæmia, and hæmaturia are among the more severe toxic manifestations occasionally observed in the early stages of treatment, and at least one patient treated with diasone has died from agranulocytosis. Sometimes, too, an acute febrile exacerbation of the disease (lepra fever) is precipitated by the drugs. Most of these troubles can be averted by beginning treatment with very small doses and cautiously increasing them over a period of weeks or months until tolerance is established. The full dosage must then be given for at least a year, with brief intermissions, before a clinical result can be expected.

Some American workers think that one of the antibiotics will ultimately be found to be therapeutically active in leprosy. Penicillin has been shown not to influence the course of a basic lepromatous infection, though it helps to overcome associated secondary infections. Streptomycin has been given intramuscularly in big doses (250,000 units three-hourly) for four months by FAGET and ERICKSON [6] who believe that it benefited the leprotic lesions, though the results were not conclusive. The treatment is exacting, and the drug caused toxic manifestations necessitating its abandonment after this period. As Sir LEONARD ROGERS suggests, a combination of drugs—perhaps some antibiotic with a sulphone—may turn out to be more effective than any drug alone, since in tuberculosis, which has many features in common with leprosy, there seems to be no doubt that streptomycin and sulphones exert a synergistic action.[7] To carry the analogy with tuberculosis still further, when *p*-aminosalicylic acid is more plentiful it might well be worth while to investigate its activity in leprosy. Though its use in tuberculosis is still in the early experimental stage this drug seems to be one of the few which combine a specific action on acid-fast bacilli with reasonable freedom from toxicity.

1. Fromm, E., Wittman, J. *Ber. disch. chem. Ges.* 1908, **41**, 2269.
2. Rist, N. *C.R. Soc. Biol., Paris*, 1939, **130**, 972.
3. Rist, N., Bloch, F., Hamon, V. *Ann. Inst. Pasteur*, 1940, **64**, 203.
4. Faget, G. H., Pogge, R. C., Johansen, F. A., Dinan, J. F., Prejean, B. M., Eccles, G. C. *Publ. Hlth Rep., Wash.* 1943, **58**, 1729.
5. Muir, E. *Intern. J. Leprosy*, 1944, **12**, 1.
6. Faget, G. H., Erickson, P. T. *J. Amer. med. Ass.* 1948, **136**, 451.
7. Lincoln, E. M., Kirmse, T. W., De Vito, E. *Ibid*, p. 593.

General Hood Retires

IN the first phase of a long war the recommendations of the medical services seldom receive due attention: man-power seems plentiful, and the main business of all branches of the Forces is rapid expansion. It was towards the close of this phase that Sir ALEXANDER HOOD in 1942 succeeded Sir WILLIAM MACARTHUR as director-general of Army Medical Services, and his first achievement was to form at the War Office a group of people capable of fulfilling every task of the decisive stages of the war. Of the directorates, which soon increased to a dozen, all but one were headed by regular officers; but in addition he had the help of a large number of civilians, eminent in their own line, who were asked not only to advise on policy but also to take responsibility for providing

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the specialist services that would meet the needs of all the armies in the field. United by their desire to serve, these experts were divided by their belief in the importance of their own specialties, and they were mostly unaccustomed to the ways and aims of their colleagues in the regular service. It says much for HOOD that he was able to build so much diverse material into an efficient and smoothly running machine. As its governor, he had to listen to the proposals of each and all of his directorates, branches, and consultants, and from these select and support those that were practicable and compatible and would in the end give most benefit to the soldier. His genial, even jovial, control of his group was sure and firm: he attracted to the service the complete loyalty of his associates, and by loading them with responsibility he extracted the greatest contribution each could make. Judged by results, the medical service thus directed and conducted was as good as any army has known.

HOOD did more, however, than perfect a mechanism inherited from his predecessor: he enlarged its scope. His innovating quality is revealed most clearly, perhaps, in the support he gave, often against advice, to the development of psychiatry at a time when this had to contend with opposition not only from powerful military authorities but also from powerful members of our profession. Another thorny question was that of investigation into matters of health and military efficiency, requiring a modus vivendi with the Medical Research Council. From the beginning of the war the council had placed its facilities at the disposal of the Forces, and when HOOD took office it was engaged in numerous inquiries for the Army. Believing, however, that research must not be divorced from active service and become the monopoly of an outside body, he felt that the best results would be obtained by establishing, within his staff, a directorate of medical research, which should collaborate with the M.R.C. and facilitate the work of its operational research units. Serving officers were encouraged to propose and undertake investigations, and in order to help them, and to supply a factual basis for administrative policy, a statistical section was developed in the research directorate. Meanwhile, as the war entered its later phase, the conservation of man-power became the major preoccupation of the Army Council, and the preventive and health-promoting activities of the Army Medical Department increasingly outweighed the purely curative. Ceaseless changes in the categorisation of personnel, more systematic efforts at reablement, and medical contributions to the maintenance and improvement of morale were the order of the day; and the change of emphasis was illustrated by HOOD's inclination to change the name "medical services" to "health services" and his desire for the replacement of sick-parades by a "doctor's hour" comparable to the "padre's hour." At the same time, the application of scientific methods to the military art faced the medical director-general with a difficult and almost new problem. Medicine was now asked to concern itself not only with the health of the individual as a human being but also with his efficiency as a fighting animal; and in pursuit of relevant information officers of the Royal Army Medical Corps were led into activities which must deprive them of the protection of the Geneva Convention. After long and careful thought HOOD decided that, if the Army was to have the best medical attention, its medical services must dissociate themselves from everything not related to the preservation and promotion of the health of the soldier as a human being; and all inquiries into military efficiency were accordingly passed over to the Scientific Adviser to the Army Council, under whose control medically qualified officers could engage in "aggressive medicine" without making any claim on the protection of the red cross. Medical scientists applying their science to purely military matters were rightly distinguished from doctors bound by the Hippocratic oath and solely concerned with promoting health and preventing and curing disease.

It can fairly be said that under General HOOD's direction the Army Medical Services disregarded no advance in medicine, and reduced almost to a minimum the time-lag between discovery and application in the field. The effect of his work was a reduction in pain, suffering, and mutilation, and he has the privilege of knowing in his own time that what he did was good. In doing it he attracted the affectionate loyalty of those who served with him, and now that —too soon, it seems—he has stepped off the top of the inexorable Service escalator they will wonder how his high talents can be further employed. It has been said that, even now, his capacity has never been fully tested; and certainly the best reward for a man who has succeeded in one task is to give him another and harder. If we had to choose, we should suggest the governorship of some part of the Empire where medico-sociological problems are paramount. Meanwhile we can only wish the new director-general, Major-General CANTLIE, equal success—without the opportunities of war.

Disabilities: and How to Live with Them

THE effect of a chronic disability depends on its nature and extent, on the disabled person's age, financial standing, intelligence, occupation, and education, and on whether his family are a liability or a help—for the burden will be immeasurably lightened if someone is able and willing to share it. Besides these there are many less tangible reasons why the same lesion will make one man a querulous invalid while to another it acts as a stimulus to better things. The series of fortnightly articles which begins in this issue will, we hope, reveal some of the factors concerned; but our primary aim in getting patients to discuss their disabilities is to turn their experience to the advantage of others who face similar difficulties. The person whose happiness and efficiency depends on details of management must always make demands on the imaginative insight of his doctor; but there is, we believe, a great store of private knowledge on which they should both be able to draw in order to make the best of a bad job. The first article, by a woman who was 23 when her spinal cord was damaged at the level of T11–12, illustrates how much can be done by a patient to minimise discomforts and dangers and to enlarge the remaining openings for an active life.

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Annotations

REGULATIONS

THE Government have now made a series of regulations governing general medical, dental, and pharmaceutical services, and service committees and tribunal. These were laid before Parliament on March 15 and came into operation on March 24—on which day they were first obtainable from H.M. Stationery Office. Copies will be sent to general medical and dental practitioners, and to chemists, by the local executive councils.

The regulations amplify our information about the intended methods of operation of the new service. Though they mainly follow the pattern of the regulations of the National Health Insurance Acts, already familiar to insurance practitioners, they show some interesting and important differences. Some of these are intended to simplify and improve upon present panel procedure, while others relate to new features of the service. On another page we publish some of the main provisions of the regulations concerning general medical services, and we hope next week to deal similarly with the rules governing the powers and procedure of the statutory service committees and those of the tribunal.

SIALOGRAPHY

SIALOGRAPHY is a radiological examination which is employed less often than its usefulness warrants. This is perhaps because of the difficulty of catheterising the ducts of the salivary glands, without which it is of course impossible to introduce radio-opaque substances into the duct systems. There is no special difficulty in catheterising the parotid duct, which is reasonably large, but no-one would guarantee that he could always intubate the submaxillary duct. The sublingual duct is too small for catheterisation to be feasible.

The technique of salivary-duct catheterisation requires some preliminary organisation, a good light, considerable patience, and a modest capacity in the operator for fine and gentle movement. Everyone who has thought about salivary catheterisation has probably devised his own cannula. The type resembling a thin thiopentone-mixing needle, with or without an olive end, is suitable if it can be obtained. Some use an Andrews retrograde pyelography needle. But probably the best cannula is a short fine Pasteur pipette, its tip smoothed off in a Bunsen flame and its butt connected to a small syringe by a length (varied to suit the operator) of rubber tube. It is exceedingly important to avoid injury to the ducts. Anything thin, hollow, and smooth which will enter the duct can be used as a cannula provided it does not unduly dilate the orifice or injure the lining. The syringe, connecting rubber tube, and cannula are filled with warmed iodised oil, a substance which shows a remarkable propensity for getting too hot. With the patient sitting for parotid catheterisation or lying for submaxillary catheterisation, the cannula is introduced $^1/_4$–$^1/_2$ inch into the duct. During this manœuvre it is a great comfort to have an assistant holding the syringe, to prevent its weight dragging on the cannula and its piston sliding out to draw unwanted air into the cannula. The injection is then made slowly. Rather less than 0·5 ml. is the usual quantity of oil required, but the patient will give a clear indication when the ducts are getting uncomfortably full.

The normal sialogram is a thing of fairy-like beauty. The ducts are seen ramifying in the gland substance like the branches of a tiny fir tree. It is, however, in the demonstration of obstructions to the duct that sialography has its greatest practical value. Mr. B. Truscott, in a paper given at the Royal Society of Medicine on March 3 and as yet unpublished, emphasised the frequency with which the sialogram will reveal both the fact and the site of partial obstruction in those puzzling cases of recurrent sialitis in which neither clinical examination nor a straight X-ray film shows a calculus. One of four appearances may indicate an incomplete obstruction in a gland which neither swells after meals nor shows suppression of salivation. The sialogram may show an abrupt cessation of the duct in its extra-glandular course; dilatation of the duct behind an obstruction; a filling defect, often near the hilum of the gland; or the beading and clubbing of the intraglandular duct system which has been termed "sialectasis." All four types of obstruction, whether due to stricture or to a small radiotranslucent stone, yield to dilatation with fine probes. Sialography is also useful on occasion in elucidating the anatomy of an external parotid fistula, and it may sometimes show up a salivary tumour by a curving deformity of the duct system or a failure of a part of the gland to fill. Sialography is not often needed, but in suitable cases it may give a precise diagnosis which is unobtainable by other means.

STREPTOMYCIN SENSITISATION IN NURSES

THERE have been a few reported examples of dermatitis arising in laboratory technicians and others who have become sensitised to penicillin from constantly handling solutions. Rauchwerger and his colleagues [1] in the U.S.A. now suggest that acquired sensitivity to streptomycin constitutes "a definite occupational hazard for nurses, pharmacists, laboratory technicians, or any one concerned with the administration or handling of the drug." During twenty months in a thousand-bed tuberculosis hospital streptomycin was given to 233 patients, and 6 nurses developed symptoms of sensitisation. An initial erythema was followed by severe pruritus and a papulovesicular eruption on the fingers, and in 5 cases there was also œdema and itching of the eyelids, presumably from rubbing this area with the fingers. The anti-histamine drug 'Pyribenzamine' effectively relieved the itching. These symptoms did not develop until the nurses had been handling streptomycin for at least six months. Intradermal tests with 100 units of streptomycin were done on 97 nurses; definitely positive reactions were noted in 7 and doubtfully positive reactions in 6. The possibility that sensitisation had arisen from an actinomycotic infection was considered, but no evidence of such an infection was found.

By way of prophylaxis, Rauchwerger and colleagues advise all who handle streptomycin or the syringes and needles used in its administration to wear rubber gloves and to wash their hands thoroughly after possible contamination. They would also submit all such people to periodic intradermal tests, to detect sensitisation before symptoms have developed.

SURGERY FOR INTERMITTENT CLAUDICATION

THE muscles of the calf are often the site of severe disabling pain brought on by exercise though the patient has no other symptoms of peripheral arterial obstruction. If this pain can be relieved the patient may again become a wage-earner and a useful member of the community. In many patients lumbar ganglionectomy is of great benefit, prolonging the "claudication time" or even effecting a symptomatic cure; but in many cases there is no improvement. These are the candidates for myoneurectomy of the gastrocnemius or of the soleus as described by Mr. E. Jepson at a meeting of the section of surgery of the Royal Society of Medicine on March 3.

The pain must be assigned to the correct muscle by injecting hypertonic saline into the tender spots always present in the calf. Briefly, if the severe claudication-like

1. Rauchwerger, S. M., Erskine, F. A., Nalls, W. L. *J. Amer. med. Ass.* 1948, **136**, 614.

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pain caused by the injection is referred to the back of the knee it originates in the gastrocnemius, whereas pain originating in the soleus is referred to the heel. This pain of injection can be immediately relieved with procaine. The ideal case for operation is obliterative arterial disease affecting the arterioles but leaving the main vessel patent. When the main vessel is obstructed the symptoms are usually more diffuse, and, owing to the development of a collateral circulation, more likely to be relieved by ganglionectomy. The operation is an anatomical dissection of the muscular branches of the medial popliteal nerve at the back of the knee and the upper part of the calf, and the division of those branches supplying the affected muscles. Since the affected muscles are ischæmic, great care must be taken to ensure accurate healing without sepsis—the only complication likely to arise. After operation the patient is free from exercise pain and soon walks actively and well. Before denervation the ischæmic muscles were wasted, so the patient learnt to walk, and even run, without using them more than necessary; his rehabilitation therefore started before operation, a fact which explains his rapid recovery. Probably many patients are quicker to walk normally if they do not know that a muscle has been paralysed. This simple operation must not be performed without careful investigation of the site of pain, or it will soon fall into disrepute.

RADIO-SODIUM STUDIES IN HEART-FAILURE

THE use of radioactive or stable isotopes in biological research makes it possible to follow the distribution and fate of a single element in the body, for it can be assumed that the normal elements behave similarly since the body usually cannot differentiate between one isotope and another. At St. Mary's Hospital on March 19, Prof. G. E. Burch, in the fourth of the series of Medical Research Society invitation lectures, described the studies carried out by his group at Tulane University, New Orleans,[1] with radio-sodium in chronic congestive heart-failure. They set out not to confirm or refute any theory of mechanical failure of the pump but rather to increase our understanding of the abnormal water and electrolyte metabolism underlying cardiac œdema. The two radioactive isotopes of sodium with half-lives of suitable length, Na^{24} with 14·8 hours and Na^{22} with 3 years, have both been available to Burch, but his present paper dealt only with short-term studies with Na^{24}, though unpublished observations with Na^{22} over periods up to 9 months in single patients have produced substantially the same findings. The outstanding abnormality of sodium metabolism in cardiac failure is the slow "turn-over" rate. In normal subjects half the total amount of sodium in the body is replaced in about 11 days, whereas in cardiac failure this takes about 40 days. The sodium retention runs parallel with a reduced clearance of plasma-sodium by the kidneys. Futcher and Schroeder [2] showed that hypertonic saline given intravenously was retained longer in patients with cardiac failure than in normal people, and they postulated that this depended on increased reabsorption by the renal tubules. Burch found a large increase in the percentage tubular reabsorption of sodium filtered by the glomeruli. Merrill [3] and Mokotoff et al.[4] maintain that the decreased sodium excretion is secondary to diminished glomerular filtration in the presence of constant tubular reabsorption; in spite of reduced renal blood-flow there is an extraordinarily high filtration fraction (glomerular filtrate expressed as percentage of the total renal plasma flow) in congestive failure which makes it difficult to accept the view of diminished sodium filtration. Whatever the renal dynamics are in detail, the sodium retention can be abolished by mercurial diuretics.

As yet these studies have yielded no new concept of the disturbances in cardiac failure, though they suggest that the œdema which forms part of the congestive-failure complex is secondary to a disturbance in renal function rather than to some imbalance in capillary dynamics. More striking are the findings of sodium exchange in the normal subject. In following the equilibration of intravenously injected radio-sodium (at most a few mg. of sodium is introduced) between intravascular and extravascular fluid spaces it may be assumed that the movement of Na^{24} is only a reflection of the movement of ordinary sodium (Na^{23}). Some 32% of the total plasma sodium diffuses out from the vascular bed per minute, while an equal quantity of sodium moves in from the extravascular spaces. This rate of exchange is very similar to that found by Gellhorn et al.[5] working with dogs. Expressed as total sodium chloride which crosses vascular capillaries in either direction in the 24 hours, this amounts to 40,000 g. or more picturesquely to "half a sack of salt." If the relative rates of sodium and water diffusion are the same in man as in the guineapig,[6] this would be equivalent to a movement of 6300 litres of water in the day.

COMMEMORATION OF FRANCIS CHAMPNEYS

ON March 25 a service was held at the church of St. Bartholomew-the-Great on the centenary of the birth of Sir Francis Champneys, obstetric physician to St. Bartholomew's Hospital, vice-patron of the Royal College of Obstetricians and Gynæcologists, and chairman of the Central Midwives Board for 27 years after its establishment in 1902. The congregation included representatives of Australia, Canada, New Zealand, South Africa, India, and Pakistan; Mrs. Attlee and Lady Cripps; the presidents of the three Royal Colleges, the Royal Society of Medicine, the Royal College of Nursing, the Royal College of Midwives, and the Society of Medical Officers of Health; the Dean of St. Paul's, the master of the Society of Apothecaries, the secretary of the Medical Research Council, and the chairman of the Central Midwives Board; many governors and members of the staff of Barts, with the matron and nurses; and a number of midwives from the Royal College of Midwives and nurses from the Royal College of Nursing. The hymns and anthem were among those composed by Sir Francis Champneys himself, and the lesson read by Lord Moran was the passage from *Ecclesiasticus* in honour of physicians. Sir William Fletcher Shaw, who delivered the address, said that Champneys is remembered above all as one who gave continuous labour and ability to the task of improving the midwifery service of this country. That service was his permanent memorial. When largely through his efforts—and against much opposition from the laity, the profession, and the midwives themselves—the Government set up the Central Midwives Board, he was given the difficult task of raising standards without interfering too much with the existing service: under a chairman with less faith and vision and dynamic force, progress would have been slower, and under one with less patience and insight it might have been chaotic. The improvement made in forty years bore witness to the success of a man who touched public and professional life at many points but whose most characteristic feature was his fearless honesty.

ON March 22 Lord MORAN was re-elected president of the Royal College of Physicians of London.

1. Burch, G. E., Reaser, P., Cronvich, J. *J. Lab. clin. Med.* 1947, **32**, 1169.
2. Futcher, P. H., Schroeder, H. A. *Amer. J. med. Sci.* 1942, **204**, 56.
3. Merrill, A. J. *J. clin. Invest.* 1946, **25**, 389.
4. Mokotoff, R., Ross, G., Letter, L. *Ibid.* 1948, **27**, 1.
5. Gellhorn, A., Merrell, M., Rankin, R. M. *Amer. J. Physiol.* 1944, **142**, 407.
6. Merrell, M., Gellhorn, A., Flexner, L. B. *J. biol. Chem.* 1944, **153**, 83.

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Special Articles

GENESIS OF THE ASSOCIATION OF CLINICAL PATHOLOGISTS *

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IN what used to be called the "post-war" but is now the "inter-war" period from 1919 onwards many people had come to realise that something must be done to get British medicine out of its rut, and were engaged upon that task. Both the Medical Research Council in this country and the Rockefeller Institute in the world at large were concerning themselves, and one result of their efforts was the formation of the clinical units at certain of the London teaching hospitals.

The intention was that the clinical units should act as germinal centres from which a new approach to, and a new outlook upon, medicine should permeate first the institutions in which they had their being and thence throughout British medicine. But it did not work out entirely in that way; some regarded the units as mere excrescences or even as cancerous growths upon the institutions in which they were lodged, and accorded to them a poor reception. But in spite of everything the units did serve again to lay that stress on pathology as the basis of medicine which had marked the work of Hunter, Bright, Addison, Gull, Sutton, and many another in the last preceding great phase of British medicine. All these gladly used every facility offered by the laboratories of their days for the extension of their powers to observe the processes of disease; but latterly there had grown up a certain snobbery which saw something discreditable and unsporting in the use of artificial aids to diagnosis; for the complete physician his five primary senses aided by his sixth or clinical sense were supposed to suffice. (For some reason an exception was made in favour of the stethoscope, which always retained its respectability.)

The arrival of insulin as a therapeutic agent at about this time offered impressive proof of the place of the laboratory in clinical medicine and established it firmly in the control of treatment. It became clear that one of the essential portals of approach to clinical medicine was through the laboratory, and many of us made it our business to open that portal as widely as possible. In those days indeed it was—

> "... happiness to live
> When every hour brought palpable access
> Of knowledge ..."

But this ferment of activity was largely confined to the university teaching hospitals, especially in London. The provinces were left to walk in darkness; to become attached to a non-teaching hospital in the provinces meant severance from the university hospitals almost beyond the possibility of return. Yet then, as now, it was on the non-teaching hospitals that the greater part of the population of this country depended for its treatment; and these hospitals had not stood still. Many had provided themselves with laboratories and had pathologists upon their staffs. I joined their number when in 1924 I became attached at the Wolverhampton and Staffordshire General, now The Royal, Hospital, and it was among these pathologists that the Association of Clinical Pathologists was brought to birth.

The pathological department in those days offered a poor appeal to the charitable public upon whom the voluntary hospitals depended for their support; as a lure for contributions it could not compete with the operating-theatre, and simply was not in the same class as a home, or even a swimming-bath, for nurses. It is a tribute to the wisdom and foresight of the boards of governors of voluntary hospitals as a whole that so many of these had their own pathological departments; but always these departments were starved for funds, and it was generally accepted that, even if not a source of revenue for the hospital, the laboratory should at least pay for itself and provide the livelihood of the pathologist and his meagre staff. Indeed this heresy is hardly yet extinct. Naturally this led to a scramble for whatever funds might be going, and fully explains why the association was forced in its early days to concern itself so greatly with miserable matters of finance, costings, and fees.

The problem presented itself to me personally in an acute form when in 1926 I found myself faced with an attempt on the part of my own county council to establish a free-for-all pathological service. The success of this design would have been ruinous to my department, upon which I was vain enough to believe the healthy development of the practice of my own hospital to depend. On looking round I found similar attempts to corner pathology under way in various parts of the country.

It is now a commonplace that an active pathological department is essential to the health of medicine in any district, both in and out of hospital; but in 1926 this was far from being the truism that it is today. There is now general agreement that clinical pathology can only properly be carried out by those in close and continuing touch with clinical work, and in laboratories attached to hospitals, but in 1926 many thought that a postal service could meet all requirements and were engaged in trying to concentrate the pathological work of the country in centres unattached to hospitals and out of touch with clinical work.

There was grave danger that clinical pathology would become a sterile subject having no real relation to the practice of medicine. Further, closely linked with this was the threat to the development of hospital practice; for, with a cheap or free postal service in pathology available, it was difficult to persuade the governors of voluntary hospitals, depending on what they could wring from the public, to provide laboratories to do something which it appeared might be done more cheaply or for nothing elsewhere.

PREPARATORY STEPS

I looked round for support in what appeared to me to be a struggle for the healthy development of medicine not only in my own area but throughout the country, and suggested the formation of an association with the following objects:

(1) To better the conditions of pathological practice and to improve the status of clinical pathologists.

(2) To secure the recognition of clinical pathologists on the same level as consultants in other branches of medicine.

(3) To encourage and where possible to assist in the development of such teaching in the medical schools as should ensure the supply of qualified medical men and women fitted to assume charge of hospital laboratories throughout the country.

(4) To hold meetings at which members might exchange views on their work and the conditions under which they carried it out.

(5) To secure adequate remuneration for pathologists attached to hospitals.

(6) To enter into touch with the Laboratory Assistants' Association with a view to encouraging the education of laboratory assistants and the placing of them in suitable posts.

I approached first those whom I regarded as constituting the head and front of pathology in this country. But among the chiefs of the university departments of pathology I found no great measure of support; mostly they appeared to be satisfied that in pathology all was for the best in the best of all possible worlds; though one distinguished professor, who I am glad to say is still with us, remarked that he could not believe it right that the

* Abridged from an address at the coming-of-age meeting of the association on Jan. 30.

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pursuit of pathology should be limited, as in his own department, to the fortunate possessors of private incomes.

My own feeling was that clinical pathology was so important that it ought to attract to itself the best brains in medicine. Even the best brains, however, require material as well as intellectual and spiritual nourishment, and I held and still hold that the labourer is worthy of his hire and that to demand of him a lofty and high-minded detachment from all considerations of remuneration is cant of a peculiarly pernicious form.

It was among the provincial pathologists that I found my main support; and the letter in the *Lancet* and the *British Medical Journal* of Jan. 1, 1927, which called our association into being was signed by 11 pathologists, all but one of whom were attached to provincial hospitals. From the first it was evident that the pathologists attached to non-teaching hospitals, particularly from the provinces, were the most keenly interested; of the 33 who attended the inaugural meeting 22 were attached to provincial hospitals and only 4 held university posts. The late Dr. G. C. Anderson, then secretary of the British Medical Association, was present as an observer; he always remained a good friend of the association and, until his untimely death, afforded to it invaluable advice and assistance.

INAUGURATION

The association was inaugurated on motion of Dr. A. G. Shera, seconded by Dr. W. H. Grace, and on motion of Dr. Arnold Renshaw, seconded by Dr. J. G. Greenfield, its aims were defined as they still stand in our rules: "to develop the application of pathology in relation to medicine and to protect the interests of those engaged in its study and practice." There was some debate about the title of the society; that by which it now goes was canvassed, but it is a comment on the state of our subject in those days that a certain odium then attached to the term "clinical pathology," which had come to be associated with the indiscriminate brewing of vaccines and other practices having financial rather than either clinical or pathological relevance. It was on motion of Dr. Renshaw that the society started life under the name of the "British Pathologists' Association," which it bore until 1930. By that time, and largely, I believe, as the result of the efforts of this association, the term "clinical pathology" had lost its unfortunate connotations and we then assumed our present name.

The late Dr. Powell White, though unable to be present at the inaugural meeting, wrote expressing his sympathy and offering his support. From the end of the last century he had fought with tongue and pen for the furtherance of the aims of the association, and the inaugural meeting showed its appreciation of his efforts by electing him the first president. His untimely death in 1930 was a grievous loss both to pathology and to ourselves. Before dispersing, the meeting elected as its first council Drs. Grace, Greenfield, G. Hadfield, Renshaw, A. F. S. Sladden, R. V. Solly, and Shera, with myself as secretary.

FIRST TASKS

Provision of Service

Of the tasks to be tackled the most pressing was the provision of a service in clinical pathology for the vast number of patients cared for under the National Health Insurance Acts. These Acts, as they then stood, and for that matter still stand, offered to the patient everything in the way of medicine and drugs but made no provision whatsoever for diagnosis. Their framers either regarded correct diagnosis as a matter of minor importance or believed that in it the practitioner required no assistance. Neither belief was shared by the panel practitioners themselves, who through their panel committees and the B.M.A. had for years clamoured in vain for the provision of a laboratory service within the framework of the Acts. To meet the want, attempts were being made by various agencies, commercial and governmental, to provide a postal service. Pathologists and practitioners alike agreed that such a postal service, with absence of direct contact between pathologist, practitioner, and patient, was not, and never could be, satisfactory; but the idea of the pathologist as a consultant was only just taking shape, and in the meantime there was grave danger that clinical pathology would be divorced from clinical practice, with results disastrous to the proper unfolding of medicine.

The council at once became embroiled with various local authorities trying to develop services in clinical pathology in connexion with their public-health laboratories, and at the same time opened a campaign to move the Ministry of Health to introduce such changes into the National Health Insurance Acts as would make available a service in clinical pathology based upon the voluntary hospitals. Such a development would have given encouragement and support to these hospitals in their effort to establish their own laboratories, and would have been of inestimable benefit to the practice of medicine, particularly in the provinces. At the time we appeared to make little impression upon the Ministry of Health, but possibly our efforts were not so unavailing as they then appeared; it may after all have been the blessing of Sir Arthur MacNalty which checked further incursion into the field of clinical pathology on the part of the local authorities, thus keeping the way clear for development along the lines we wished to follow. It is satisfactory that the principle, formulated in those early days by this association, that clinical pathology can only properly be practised in laboratories attached to hospitals and by those in close and continuing touch with clinical work was fully and freely adopted in the organisation of the pathological service of the Emergency Medical Service by Sir Philip Panton.

Finance

The circumstances of those days forced us to establish the principle that pathological work should be paid for by per item. This principle was at our suggestion adopted by the B.M.A. and later was embodied in the E.M.S. service in pathology. Up to that time no accurate costing of laboratory procedures had been undertaken, and we found ourselves faced with the necessity of getting out a schedule of fees. In this herculean task the council was led by Dr. Renshaw. On the basis of his own carefully kept accounts, and with the assistance of reports from various provincial laboratories on the time taken in various routine procedures, Dr. Renshaw compiled a schedule of costs and presented it to the council so early as April, 1927. This schedule was adopted by the B.M.A. and for many years served as a most valuable guide to members. Under the new dispensation it is likely to become mainly of historical interest, but in its time it was a notable piece of work.

Education

In spite of its preoccupation with financial and political affairs the council from the first kept steadily in view the educational function of the association. In those days the paucity of our members having academic affiliations and the modesty proper to so young an association forbade us to offer unsolicited advice to the academic teachers of pathology. Members will note with pride that both these considerations have ceased to be effective. Whether we shall now attempt formally to embark on the education of clinical pathologists is now being eagerly canvassed by many of our members; certainly at that time we did not feel that we could do so; this we felt was a matter for universities and established teaching bodies. We therefore addressed to the medical faculties of the universities of England, Scotland, and Wales and to the Royal College of Physicians of London the suggestion that there should be established a diploma in clinical pathology. In November, 1927, the president,

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Dr. Greenfield, and myself put the views of the association before the board of the faculty of medicine of the University of London, and in 1929 the university constituted the present diploma in clinical pathology. Under the original regulations the course of study for the diploma had to be taken in the pathological department of a medical school of the university; but in 1932, on representation from this association, the university agreed to the recognition of suitable pathological departments for the purposes of the diploma, even though unattached to any university. I am proud to be able to say that my own was the first laboratory of this sort to be so recognised.

We were grateful to the University of London for its recognition of the importance of our subject, but we felt that our chief educational effort must be through the agency of our own members, and I believe this still to be the case. From the first the educational value to themselves of our meetings was recognised by our members; in them we found the opportunity, until then sadly wanting, of maintaining touch and of exchanging views with other workers in our own field. A further move towards the education of its members and the standardisation of laboratory technique was the publication by the association of a series of broadsheets on standard methods. This was a most valuable activity, but it involved an amount of work greater than the then membership of the association could sustain. There is every hope that with its larger membership and in the spacious and leisured days to come the association may be able to resume publication of these broadsheets.

THE ASSOCIATION'S GROWTH

In those days our membership was such that we could readily find accommodation in any provincial town large enough to have a hospital with a competent pathological department, and it was our general rule to hold our summer meetings in the provinces. It is unlikely that with our present membership we shall ever again be able to find accommodation for meetings of the whole association in other than university towns, but I believe that the provincial branches, now being called into existence through the initiative of our secretary, Dr. W. H. McMenemey, will maintain that atmosphere of intimacy and comradeship which was the mark of our earlier meetings.

In those early days we all knew each other personally, which I fear it is now difficult for us to do, and much of the discussion which shaped our policy as an association took place at our dinners; we early recognised the power of the bond established by eating (and drinking) together, and this tradition will I hope never lose strength.

If in trying to describe the antecedents of the association I have spoken too much of myself, I can only plead in the words of the *pius Æneas* that of these things *pars magna fui* and ask you to accept what I have said as an *apologia pro vita mea*.

THE DYKE MEDAL

In recognition of Dr. S. C. Dyke's services in its foundation, the Association of Clinical Pathologists has created a Dyke lectureship. The bronze medal here illustrated will be awarded to the lecturers. The reverse has a space for insertion of the recipient's name.

NATIONAL HEALTH SERVICE

REGULATIONS FOR GENERAL PRACTICE

UNDER the title of Statutory Instruments, the Government have now published regulations for general dental services (1948, no. 505), general medical and pharmaceutical services (no. 506), and service committees and tribunal (no. 507). The following information is taken from document no. 506.

LOCAL EXECUTIVE COUNCIL

Medical list.—The executive council prepares a list of doctors entitled to give service, and distinguishes in this list between those undertaking to provide general medical services only, those giving maternity medical services as well, and those included in the list for maternity services only. The list has to be kept regularly revised, and information of alterations has to be conveyed to the Minister and to various statutory committees, such as the Medical Practices Committee and the local medical committee, within seven days of the alteration. Other bodies (such as the local health authority and the regional hospital board), which are less intimately concerned, receive a revised list every three months.

Admission to medical list.—The doctor applies on a prescribed form, and states whether he wishes to undertake maternity services or not. If he applies before the appointed day for inclusion in the list of an area where he is already practising (other than as a paid assistant) he is automatically admitted to the list. Otherwise the council before including his name in the list seeks the approval of the Medical Practices Committee.

Reports to the Medical Practices Committee.—Yearly returns are made by the executive council of information required to enable the M.P.C. to judge the adequacy of medical services in the area.

Procedure following a doctor's death or retirement.—If a doctor dies, or retires, the executive council forthwith informs the M.P.C. and reports also on the need for filling the vacancy. The council may in such case itself appoint a locum tenens to take temporary care of the patients, or in the case of a deceased practitioner may authorise his executor to do so. Such arrangements shall be for a period not exceeding, except in special circumstances, two months.

Advertisement of vacancies.—A council is entitled to give public notice of a vacancy for a medical practitioner in its area by advertisement in the press or otherwise.

MEDICAL PRACTICES COMMITTEE

Regulations set out the periods of service, and provide for the retirement each year of a third of the committee. The Act lays down that five out of the six medical members of this committee shall be actively engaged in medical practice. By regulation, if any member appointed as being a person actively engaged in medical practice ceases to be so engaged he shall be deemed to have resigned. Anyone aggrieved by a decision of the M.P.C. may appeal to the Minister, and may, if he wishes, employ counsel or solicitor to speak at his appeal if there is an oral hearing.

PRACTITIONER AND PATIENT

Choice of doctor.—The patient can take his medical card, or signed form of application, for acceptance to any doctor. Any patient "entitled immediately before the appointed day to medical benefit under the National Health Insurance Acts, 1936 to 1941, and then included in the list of a practitioner who, as from the appointed day, provides general medical services . . . shall be deemed to be included in the list of that practitioner . . . unless and until he has chosen another practitioner or given notice in writing to the Council of his desire not to be so included."

Change of doctor.—This can be made at any time, without prior notice to the council, and without any necessity for the formal consent of the doctor on whose

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list the patient is at the time included. The patient takes his card to the new doctor, says he wishes to change, and if accepted is entitled forthwith to treatment.

On the death or retirement of a doctor his patients will be notified (as at present) and informed of the name of his successor, and patients not exercising their right to change will be included in the list of the successor.

Right of practitioner to have patient removed from his list.—This can be done at any time by giving seven days' notice to the council.

Right of patient to cease to avail himself of general medical services.—This can be done at any time by giving fourteen days' notice to the council.

Choice of doctor for a child.—This choice shall be exercised "on behalf of any person under the age of sixteen by the mother, or in her absence, the father, or in absence of both parents the guardian who has the care of the child."

Allocation scheme.—The local executive council, after consulting the local medical committee, is to prepare a scheme to allow for the allocation to a practitioner of persons who for one reason or another have not been able to arrange themselves their acceptance by a doctor. The local medical committee supplies half the members of the allocation committee. It may ask from time to time for amendment of the scheme, which may, in default of agreement between the council and the committee, be amended by the Minister.

Permitted numbers of patients.—For a practitioner working alone a maximum of 4000; if in partnership no partner may have more than 5000 patients and the average for all partners shall not exceed 4000. For each assistant employed an extra 2400 patients may be allowed.

Temporary residents.—The arrangements here are similar to those at present in force except that the application for treatment as a temporary resident will be made on a separate form (part retained by doctor, part sent to the council) and not on a special part of the medical card.

The practitioner's lists will be kept revised with each notified death and change of doctor. Revisions will be made to date and not quarterly.

MATERNITY SERVICES

A patient having been diagnosed as being pregnant may arrange for maternity medical services to be provided for her by her own practitioner if he is included on the medical list as having obstetric experience, or, failing this, with any other practitioner on the medical list having obstetric experience. Change of doctor can be arranged by agreement, or by reference to the executive council. Maternity medical services may be arranged under temporary-resident provisions. The range of service to be provided is stated as including:

> "advice in regard to antenatal supervision; antenatal care including an initial medical and obstetric examination and an examination at the thirty-sixth week of pregnancy or at any other time the practitioner thinks necessary; attendance at an abortion or other emergency in connexion with a pregnancy if the practitioner is summoned on behalf of the patient; attendance at the confinement after the twenty-eighth week of pregnancy, if in the opinion of the practitioner it is required or if he is summoned to the confinement by the midwife in attendance; medical supervision of the mother and child for a period of fourteen days after confinement, and postnatal care, including a medical and pelvic examination of the mother at or about six weeks after confinement."

TERMS OF SERVICE

These terms first set out the categories of patients entitled to treatment. They state that "a practitioner shall not be responsible under these terms of service for the treatment in hospital of a person admitted thereto for treatment unless he is a member of the staff of that hospital."

Title to obtain treatment.—This is established by the production of a medical card. Failing its production a fee can be charged, if an account is rendered or a receipt given on which the patient can receive a refund if he has later proved his entitlement to treatment.

Range of service.—This includes all proper and necessary treatment, but excludes services which involve the application of special skill or experience of a degree or kind which general practitioners as a class cannot reasonably be expected to possess.

Reference to hospital and specialist services.—If the patient needs services outside the scope of the practitioner's obligations, "but such treatment is to the knowledge of the practitioner available as part of the hospital and specialist services, the practitioner shall inform the patient of the fact and if the patient so wishes the practitioner shall take all necessary steps to enable him to receive such treatment." Under N.H.I. arrangements practitioners may charge their patients fees for giving certain services outside the general scope of the service. With the provision of hospital and specialist services the practitioner's right to do this is now curtailed and is governed by the provision that such treatment shall only be charged for if "given (i) in special accommodation in a hospital set aside for private patients in accordance with section 5 of the Act, or (ii) in a registered nursing-home, not being a hospital providing hospital and specialist services under the Act, if in either case the practitioner is serving on the staff of a hospital providing hospital and specialist services as a specialist providing treatment of the kind required by the patient."

Treatment at doctor's surgery.—The practitioner is required to provide proper and sufficient surgery and waiting-room accommodation which is subject to inspection by the council. *Certificates* under the National Insurance Acts, 1946, or reasonably required under any other enactment, must be issued free of charge. *Records* must be kept, and are subject to inspection as under N.H.I. arrangements.

Deputies, partners, and assistants.—Regulations allow for the practitioner's duties being performed by deputy, by partner, or by assistant if he is for reasonable cause not available. For providing maternity services the deputy or assistant must be "a medical practitioner having maternity experience."

Revision of terms of service.—Unless any alteration in terms of service comes from the operation of an Act of Parliament, or has been centrally approved by the Minister after consultation with the representatives of the practitioners, the executive council is required to consult with the local medical committee and give at least three months' notice before altering the terms of service.

Resignation from service.—The practitioner can resign on giving three months' notice.

Remuneration of practitioners.—This will be arranged in accordance with a distribution scheme prepared by the executive council after consultation with the local medical committee, which committee may also from time to time require its amendment. In default of agreement between the council and the committee the scheme may be amended by the Minister.

The following payments are to be distributed:

By way of remuneration and allowances.—(i) A fixed annual payment of £300 as part of the remuneration: provided that after such period as the scheme specifies a practitioner shall be entitled to the fixed annual payment only if he has the minimum number of patients on his list specified by the scheme, unless the approval of the Minister has been obtained to its continuance in view of special circumstances; (ii) a capitation payment, that is to say, a payment by reference to the number of persons included in the practitioner's list; (iii) payment in respect of temporary residents; (iv) payment for treatment given by a practitioner in an emergency to a person not included in his list; (v) payment in respect of mileage; (vi) payment in cases in which the practitioner is

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required to provide the services of a second practitioner for the purpose of administering an anæsthetic.

Other payments.—(i) An inducement payment, that is to say, an addition to the fixed annual payment or capitation payment, in areas which are in the opinion of the Minister, after consultation with the Medical Practices Committee, sparsely populated or for any other reason unattractive to medical practitioners; (ii) a supervision fee for the training of an assistant under an arrangement approved by the Minister; (iii) payment in respect of the provision of maternity medical services by practitioners having obstetric experience; (iv) payment to practitioners in respect of the supply of drugs and appliances.

COST OF THE HEALTH SERVICES

THE Civil Estimates for health services in 1948–49 [1] recall that, in the financial year which ended on March 31, the estimated cost of interim grants to certain hospitals in England and Wales was £10,450,000. For the present year the cost of these grants is set at £3,650,000.

The gross cost of the National Health Service in the current financial year is estimated as £176,425,000 for England and Wales and £21,951,000 for Scotland, involving additional expenditure of altogether £195,045,054. The net cost of the service to Great Britain is put at £149,675,000, the difference being accounted for by appropriations in aid totalling £48,701,000, of which £27 million is to be derived from the National Insurance Fund.

This year's estimates are an imperfect guide to the normal expenses of the new service since they include the cost of (1) about nine months of services to be offered, from July 5, under the National Health Service Acts, (2) a full year of services now operated or administered by the Ministry which will be embodied in the N.H.S., and (3) expenses preliminary to the inauguration of the N.H.S. Expenses are grouped as follows:

	England and Wales £	*Scotland* £
1. Central Health Services Council, &c.	12,000	1,000
2. Hospital, specialist, and ancillary services	107,196,500	13,410,000
3. Services provided by local authorities	3,750,000	300,000
4. General medical and dental services, pharmaceutical services, and supplementary ophthalmic services	49,292,500	6,780,000
5. Other services	16,174,000	1,460,000
	176,425,000	21,951,000

The following estimates are incorporated in the total under the fourth heading:

	England and Wales £	*Scotland* £
General medical services	27,500,000	4,000,000
Pharmaceutical services	11,450,000	1,250,000
General dental services	7,150,000	1,000,000
Supplementary ophthalmic services	2,080,000	250,000

Included in the estimate for other services is £4,300,000 in England and Wales, and £500,000 in Scotland, to compensate for loss of the right to buy and sell practices.

PERSONNEL IN ENGLAND AND WALES

In the House of Commons on March 18 the Minister of Health explained that the 1947–48 estimates provided for 350 extra Ministry staff to deal with work resulting from the National Health Service Act; and provision has been made for a further 320 during 1948–49. Nearly half of these additional 670 are needed for the administration of superannuation benefit under the Act; and of the remainder most are required for other financial work in connexion with the Act. Mr. Bevan added that the total staff to be employed at the headquarters of the 14 regional hospital boards when the Act comes into force will be about 600; of these, many will have been transferred from local authorities and other bodies.

1. Civil Estimates for the Year ending March 31, 1949. Class 5: Health, Housing, Town Planning, Labour, and National Insurance. H.M. Stationery Office. Pp. 158. 3*s*.

Reconstruction

GROUP PRACTICE

REPORT OF A YEAR'S WORKING

IN view of the growing interest in the possibilities of group practice in this country and the U.S.A., the origin, organisation, and experience of the first year's work of one such practice are presented here. Such practices seem to provide better conditions for both the general practitioner and his patient, and it has been said that they are to be encouraged in the National Health Service. A committee of the British Medical Association is at present investigating the subject.

ORIGINS AND OBJECTIVES

In the summer of 1946 a night-duty rota was established among the local general practitioners to meet an increasing number of night calls. This rota worked efficiently, and there was soon evident a degree of confidence and coöperation beyond any previously experienced (the practitioners concerned were all members of the staff of the local cottage hospital and had become accustomed to work together in harmony). This mutual confidence we consider to be the foundation on which the group was later developed. Additional incentives to the formation of a local group were (1) that men returning from the Services with recent experience of non-competitive practice disliked the prospect of resuming competition; (2) that those who had had to remain at home during the war were determined that they should not continue to prosper at the expense of their recently absent colleagues; and (3) the shortage of practitioners relative to the greatly increased local population.

The only alternative to the formation of a 100% group appeared to be a combination of certain existing practices, with the consequent formation of two opposing groups in the same town. It was felt that a 100% group might resolve some of these problems, and a preliminary meeting was held to discover individual reactions to its formation. This meeting decided to explore the possibilities further, and the following objectives were named:

(1) To prevent the recurrence of pre-war professional feuds and highly competitive practice.

(2) To achieve and maintain professional unity locally.

(3) To make possible some measure of individual specialisation, if desired.

(4) To provide a means of protection against the increased pressure of work expected to follow the inception of the National Health Service.

(5) To achieve better working conditions—e.g., shorter hours of work; freedom to live away from the surgery (since in the absence of competition the goodwill of professional premises would cease to be of consequence) and thus emancipation of doctors' wives from telephone and doorbell servitude (private telephone numbers not appearing in the G.P.O. directory); non-dependence on locums for short illnesses, holidays, refresher courses, military training, conferences, &c., by reason of the larger personnel of the group; discontinuation of single-handed obstetric operations and minor surgery; freedom to enjoy in increased measure interests other than medicine, such as home life, general reading, &c.; better quality work resulting from the relative absence of hurry, and from freely available consultation among group members; and increased individual financial security.

Since it appeared highly probable that most of these objectives could be realised, the next step was to consider practical business details.

BUSINESS PRELIMINARIES

Eight doctors were concerned, and a frank exchange of balance-sheets showed no undue inequalities in income. Each doctor appeared to have been working to capacity, and incomes were therefore about equal. A partnership

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of equal shares was thus possible and was agreed to be the only satisfactory basis of practice. A deed of partnership was drawn up by a well-known firm of medical solicitors in close consultation with the doctors concerned; an independent accountant was appointed; and a joint bank account was arranged with a bank agreed by all.

The partnership deed follows orthodox lines but has some special features:

(1) An incompatibility clause allows the group, if necessary, to be relieved of any partner, without stating reasons, upon the unanimous decision of the other partners, such a partner's share to be purchased by those remaining.

(2) Policy embodied in the deed is alterable by a 75% majority decision.

(3) Surgery leases were incorporated, the rents having been proposed by the accountant on a non-profit basis, with security of tenure to the group in the event of a partner's retirement or death. Surgery furniture and equipment were valued and then purchased by the group from the original owners; personal diagnostic instruments, &c., are the responsibility of each individual partner.

ORGANISATION

Personnel.—The town is of a busy industrial-residential character, with a population of some 45,000, predominantly "lower middle-class." Panel practice and other practice are estimated to produce about equal incomes. In 1939 there were 13 doctors engaged in general practice: two firms had 3 partners each; one firm had 2 partners; 5 doctors were working single-handed. Fourteen separate surgeries were in use. In 1945 only 6 of these doctors remained, the others having retired from practice for various reasons, but eight surgeries were still in use. In 1947 one firm had taken in 2 junior partners, and when the group was formed 3 assistants (2 male and 1 female) were engaged. The present group is thus composed of 8 partners, with 3 assistants who will eventually enter partnership.

Group Surgeries.—Four of the surgeries were closed, and the work was concentrated at three main surgeries situated conveniently at the centre, east, and west of the town, but one smaller surgery was retained at a doctor's house on the outskirts of the town. The three surgeries were all situated directly on public transport routes, and were all capable of adaptation to deal with increased numbers of patients. The concentration of surgeries reduced overhead expenses—e.g., rents and maintenance costs—and fewer assistants are required than would have been needed by the separate partnerships.

Surgery Organisation.—Each of the three main surgeries has 3 or 4 doctors, including an assistant at each. Ancillary staff at present varies between surgeries, but includes 2 secretary-receptionists, 3 dispensers, and 2 trained nurses.

Two of the main surgeries have been vacated by their owners. The lower portions are now entirely given over to medical use, and flats have been provided upstairs for the staff. This arrangement makes possible a 24-hour telephone and front-door service for the doctors working from those centres; it also gives scope for a minor operating-theatre and additional consulting-rooms, dressing-rooms, &c.

Surgeries begin at 9 A.M. and 6 P.M., and, except for special clinics, there are no afternoon consulting-hours. At each consulting-hour 2 or 3 doctors are in attendance, and experience has shown that most patients will readily accept another doctor in the absence of their own, though no pressure is brought to bear on them to do so. Insured persons are free to change to the list of any other practitioner within the group. Both doctors sign part C of the medical card, with a remarkable absence of ill feeling.

ADMINISTRATION

The three subgroups function as independent units in regard to day-to-day working, arranging their own time-tables, visits, and other work. A monthly meeting of all the partners is held, and group matters are freely discussed. Bills are agreed for payment, the balance-sheet approved, and a cheque issued to each partner in accordance with the balance available in the bank. A chairman and a secretary are elected annually, and minutes are kept for reference. All accounts payable by the group, P.A.Y.E., financial statements, &c., are handled by a full-time qualified book-keeper working at the town-centre surgery. Financial supervision and advice, together with the annual statement, are provided by the group's accountant.

RESULTS OF FIRST YEAR'S WORKING

All the immediate objectives detailed above have been achieved, and several additional improvements have been effected.

Surgery hours have diminished owing to larger medical and auxiliary staff.

Night calls (8 P.M.–8 A.M.) are handled by any one partner on one night only each week; on this night he is on call for all the others. Maternity cases, however, are attended by the doctor who has been engaged, and in his absence it is his responsibility to leave a member of his subgroup on call. Incoming night calls are initially referred to the doctor whom the patient requests; he may take the call if he so desires or may refer it to the man on duty, but in either case he takes charge next day for subsequent visits, if needed.

Off Duty.—Each doctor is entirely off duty on one whole day a week, when he has no surgeries and no new calls. He is responsible for his own revisits, &c., but can often arrange these to suit his convenience. He is also free one weekend in three or four and has thirty days' holiday annually. Extra time, however, can be arranged with the approval of the subgroup—e.g., for postgraduate study, long illness, overseas travel, &c.—but the absent member has to provide a locum at his own expense.

Other Advantages.—Of the 11 members of the group 9 now live away from their surgeries and are enjoying the non-resident advantages previously mentioned. A true medical equality within the group has been achieved, for there are no senior or junior partners. Greater working efficiency has resulted from the employment of properly trained auxiliaries.

The public has a better medical service in that (1) more doctors are available; (2) each doctor no longer depends on the makeshifts of single-handed practice and is less tired and does not have to face a night emergency after possibly having had several active nights previously; (3) free choice of doctor has been carefully preserved, except in so far as each doctor is not immediately available 24 hours a day every day of the year; and (4) surgery premises have been considerably improved and are more pleasant places to wait in, and less time is wasted there.

The financial return to each partner in this first year has been satisfactory, and no complaint has been made that the new venture has caused financial loss (though it might have been otherwise had not the formation of the group coincided with the increase in the N.H.I. capitation fee).

CONCLUSIONS

The essentials for a successful group practice seem to be: first, keenness, and the continued desire and ability to coöperate; secondly, no wide inequality of income or excessive disparity in age; thirdly, no unduly high ratio of doctors to population, so that all will be fully employed and no great inequalities will develop in working hours; and finally, the basic essential, mutual trust and respect between each and every member of the group.

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Disabilities

1. A BROKEN BACK

"You have broken your back." These words were said to me seven years ago, when I was twenty-three. Could anything have been more damning to a young girl? Luckily I did not fully realise the consequences until years later.

For many months I tried to persuade myself that perhaps I had only broken a vertebra and that, once my back had set, all would be well. But my doctors and family knew this was only wishful thinking. I had fractured my eleventh and twelfth dorsal vertebræ, and my spinal cord was crushed. Without a miracle I would never be able to move again.

I was desperately ill in one of the big London hospitals—so ill that my mother did not know whether to pray for death or recovery. She realised that if I knew what my future was going to be I would give up the fight and die. She therefore wisely encouraged me to talk of playing tennis and dancing, and only gradually as the years passed did I come to know that I would never walk again.

This article is written to give comfort and hope to any other "broken backs" who think their lives have ended. For they are quite wrong; their lives have not ended, and there is much they can enjoy in this world. They still have the use of their arms and with them they need never be helpless invalids.

URINARY INCONTINENCE

I am completely paralysed from the waist down; I cannot move or feel. If someone blindfolded me and cut off my leg I would not know it had gone; my paralysis is as complete as that. Consequently I have no control over my bladder or bowel, but through trial and error I have more or less mastered this disability.

Coping with incontinence in a woman is far more difficult than in a man, and it was hard to find a solution. For a year I had a self-retaining catheter; but this was not satisfactory, as it meant there was always a risk of infection, and it was perpetually coming out as the passage became stretched. It also meant I had to have a trained nurse to look after me, a heavy expense that I could not afford. So instead we evolved a large edition of a baby's nappy. It consists of a square of flannelette blanket about 1 yd. by 1 yd. folded in a triangle. On top of that I have a triangle of soft linen mackintosh, the kind that has linen as a base rubberised on each side. Jaconet is not strong enough, and the linen prevents the mackintosh from tearing. The mackintosh is placed on my chair, then the flannelette, and I wear a pair of home-made sanitary knickers with a piece of soft mackintosh through the legs about 10 in. wide, which holds in place a "pad" made of a real baby's nappy of turkish towelling folded and wrapped round with cellulose wadding. The baby's nappy is really economy, as cellulose wadding is expensive, the cheapest being 1*s.* 5½*d.* per lb. Without the cellulose wadding I cannot think how I would manage, as it is the only thing I can find which absorbs a large quantity of fluid. The mackintosh and flannelette nappies are then fastened with safety-pins in the ordinary way. On top I wear a pair of corduroy trousers which keep everything in place; they are much more practical than skirts. In the evenings when I am in the house I wear long house-coats, or dinner frocks, as I think there is nothing uglier than a pair of misshapen paralysed legs.

Now to the question of the bowel movement. At first I had a washout every other day, but now I find that if I take a strong herb medicine (mostly senna, I gather) every other night I can manage to "go" on my own; and, though it takes about an hour, a washout is thereby avoided and no nurse is needed.

LOCOMOTION

My equipment consists of four chairs. Indoors I use a light self-propelling one. This we designed ourselves by finding a small well-sprung upholstered fireside chair. The local garage added to this two large wheels and a small one behind. The invalid-equipment shop said this was not possible as it would upset the balance of the chair, but all they had to offer was one so heavily upholstered that it was nearly impossible to move; so we boldly and successfully disregarded their advice. This chair has wooden arms, and I have a board 1 in. thick by 9 in. wide which fits across the arms when required; and it often is, for on it I iron, chop up vegetables, pile up the dishes I dry, and balance the bowl in which I wash my clothes.

Indeed there is little I cannot do about the house. I can clean my own room with a Ewbank carpet sweeper, mop it, and dust the surfaces within reach. I can cook an entire dinner on my own, using the oven, and I do all the pastry and cake-making in the house. The only snag about my cooking is that everything has to be within reach, and the kitchen looks somewhat crowded when I am at work. Almost the only things I cannot do are to clean the bath, sweep with a dustpan and brush, and do a fireplace.

My second chair is the canvas folding type, which runs on four small wheels and has to be pushed. I recommend Carter's model, Great Portland Street, W.1. It is far the lightest and best balanced and costs £7 10*s.* It is in this chair that I go shopping, and it can also be folded and put on the back of a car. I find I can scramble into a car quite easily from this chair, by being pushed straight up to the front seat, and I put my legs in first and am then helped in by someone's arm. In this chair I go to pictures and theatres. Though not usually allowed to remain in my chair I can be transferred into an ordinary seat quite easily, and I ask the people passing up and down the row if they would mind stepping over my legs.

My third chair is my most recent acquisition and has given me great joy. It is a petrol invalid chair, and I can recommend it strongly as one of the most reliable makes. It is an Argson de luxe model, made by the Stanley Engineering Co., Egham. It does 100 miles per gallon and is easy to start and equally easy to drive. Its speed is 5–25 m.p.h., but I find I drive it at an average speed of about 18–20 m.p.h. And there is no tax.

On the back I carry a small folding chair which I have had fitted on with brackets made by the local welding shop. This enables me to be completely independent, as I can be put into my petrol chair and sent off alone to visit a friend for the day, coming home in the evening without having to rely on anybody to fetch me.

I have also had a large shopping-basket made for the chair by the Blind Institute. This allows me to do our shopping, and I find small shopkeepers most obliging and quite willing to come out and take orders.

During the last six months I have lived in the home counties, and friends have often asked me to meet them for the day in London. This might seem too long an undertaking for one who is incontinent, but I have worked it out to a fine art. I always travel in the luggage van in my invalid chair, and I take with me a small canvas zip bag containing three pads, a spare nappy, a small female urinal, and two mackintosh sponge-bags to hold my wet pads. This outfit sees me through the day and I change in the cloakroom of any shop or hotel.

SLEEPING ARRANGEMENTS

I sleep on a low divan bed, about the same height from the ground as the seat of my self-propelling chair. I can therefore transfer myself from my chair to bed or vice versa without help. The other night my dog,

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who sleeps in my room, whined to be let out; so I got out of bed into my propelling chair, let her out, and got back into bed again without disturbing anybody.

In my bed I have a small mackintosh draw-sheet with a turkish towelling square on top, and then one of the famous "pads." I am sure to wet this during the night; so I grease myself thoroughly with zinc and castor oil. I find this prevents bedsores and does not harm the skin. I do not wear a nightdress, but have made myself rather glamorous "tops" about the length of a blouse. I sleep flat on my back; for if I lie on my side I am never comfortable for more than three hours; whereas, if I lie on my back, no-one need come near me until the morning.

In cases like mine bedsores cause a lot of trouble. Circulation to the lower limbs is not good, and being unable to feel you do not know when a limb is carrying too much pressure. I find my heels need watching. Some time ago I got a really nasty bedsore on my buttock, right underneath, where I sit down. I sat on a rubber ring dutifully, but it did not improve. We tried every known remedy for it, including red lotion, zinc and castor oil, acriflavine ointment, various kinds of sulphonamide powder and cream, penicillin cream, &c., but the bedsore grew larger until it was the size of a 5*s.* piece. I finally cured it by treating it with gauze soaked in pure cod-liver oil, covered with cotton-wool, and strapped in place. After having had the bedsore for a year, we cured it in two months.

BATHING

When fuel permits, I try to have a bath every day, as my body is rather like that of a celluloid doll whose dents come out magically in the heat. One person can easily give me a bath, and once in I can wash myself. I wheel myself straight up to the bath and lift my legs over the edge. I am then helped to sit on the edge of it, and from there with my hands and a little help I swing myself in. Getting out is not so difficult as might be expected; but it is a good plan to leave the buoyant water in the bath.

Our summer holidays from early childhood have always been spent on the coast of Donegal, and when I broke my back I wondered how I could ever face returning to a place which held such memories of swimming, shrimping, and walking for miles over headlands and shore. I knew my chair would bog in the sand; so instead I ride a very slow and sedate donkey. It has a small saddle, and the stirrups prevent my legs from dangling. Though I cannot grip I can balance fairly well, and someone always walks by my side just in case I wobble and fall off.

Bathing too is the greatest fun. I ride down to the water's edge on my donkey (or by chair if the sand is hard enough) and I am then lifted by two people on to a 'Lilo' and dragged out to a depth of about 5 ft., where I am tipped off and left swimming round on my own. It is quite impossible to sink when paralysed, as the limbs affected automatically float to the top. Breast-stroke is out of the question, as my lower half pushes my head under the water; but I manage to keep afloat on my back and have great fun wondering whether I shall go over or through a wave.

At first there may be waves of despair to be ploughed through by "broken backs" who accept invitations to watch dancing or outdoor sports in which they were once keen partakers. But the waves pass; and I have purposely emphasised the active life here to prevent a quite needless retreat into an artificial indoor world of books. Refuse such invitations, and there will soon be none to refuse. But accept them, and quite soon these "broken backs" will have adjusted themselves to enjoy the rôle of spectator. They will return home refreshed saying, as I have so often done: "I wouldn't have missed it for anything."

In England Now

A Running Commentary by Peripatetic Correspondents

WILL someone please contribute a note on the ætiology, pathology, and psychology of the common giggle?

The Rajah had ceremoniously departed, leaving us—the captains and the kings, the embryo newly-honourable legislators—behind to be sworn in individually by the Prime Minister as members of the new State Council. The oath for English-speaking Christians was short and of the familiar swelp-me type; that for other non-Muslims was nearly as short; but the Muslim members had a formidable and lengthy oath to deal with. It started in Arabic and went on. When it seemed to be finishing it rolled its sleeves up and got down to really solid swearing in the vernacular.

I listened idly (for I do not know Arabic) to the first part of that oath. At the fourth or fifth repetition I became conscious of a quaint triple phrase in the middle, which sounded exactly like: "Ah, laddie! Ah, laddie! Ah, laddie!" At the sixth or seventh repetition I felt something come to life deep down in me. At the eighth I realised with alarm that it was a giggle, growing rapidly and striving upwards. I must suppress this, I thought, or the next "Ah, laddie!" will sound as if directed reproachfully at myself. I swallowed, and busied myself with some papers in front of me.

No use. I then tried to fix my mind on everything sad and tragic that had ever happened, or could happen, to myself or my friends. Having exhausted this, I even thought of sad things that had happened to animals. This brought me to Gilbert's tragic tom-tit that sat on a tree by the river; and thence, with damnable and deadly accuracy, to "Tit-willow, tit-willow, tit-willow," which fatally resembled the phrase I was trying hard not to hear.

With a tremendous effort I kept the giggle from being born prematurely. It was a cool morning for this country, but beads of sweat appeared on my forehead. Two repetitions later I knew, with a wild certainty, not only that one more would induce labour but also that the infant would emerge as a horrible changeling, a loud and vulgar guffaw. Then, no doubt after a short shocked silence, I would be helped from the Council Chamber, mowing and gibbering, to my car outside. The future after that I dared not contemplate. I *might*—it was just possible—successfully plead acute cerebral malaria. But the next oath was the last, and it was an innocuous non-Muslim one. I was saved. The monster was stillborn.

Oh yes—and, *please*, a note on prophylaxis too. Don't bother about treatment; I do not ask for the impossible.

* * *

Our firm's canteen is known, though not officially, as the Senior Salmonella Club. There is also a Junior Salmonella, housed with the lesser part of the firm some distance from the main premises, which has not achieved the same heights of inefficiency as the senior institution. In those days before the war, now assuming almost a mythical Golden Age status, our canteen was well run, comfortable, clean, and cheap, and in the senior officers' room there were even quarter bottles of drinkable Burgundy to be had at less than the present cost of a pint of beer. The most important point however was its cleanliness.

Today we all know about the multitude of shortages and other difficulties which beset everyone and perhaps bear hardest on caterers. Crockery and labour are short; new washing machines are hardly to be had; detergents are scarce; and the washing turnover of eating utensils must be accelerated to a point where the loss of efficiency is all too obvious. That, at least, is the state of affairs in the Senior Salmonella. Far be it from me to condemn other firms' canteens. Many are superior to ours, and some appear to be beyond criticism in respect of hygiene—surprisingly enough under the circumstances. Still, if there has really been an increase of late in food-poisoning outbreaks (certainly more have been reported) this *may* be correlated with the increase in eating away from home, and concurrently with the aforementioned difficulties of maintaining hygienic standards. Medical officers of health are probably more aware of this than

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anyone, but I would suggest, with all respect to that hard-worked body of men, that an investigation of the present status of canteens in their area might reveal possibilities of improving conditions. Anyway we have decided to ask our local M.O.H. along to the Senior Salmonella for lunch and let nature take its course.

* * *

Happening to pass our manure-heap after breakfast on Sunday, I was astonished to see a dazzlingly white tumour, the size of a tennis-ball, bulging through the top. A little excavation revealed six nice mushrooms, and shortly afterwards I realised that the whole left side of the heap was being lifted up by something within. I removed the outer crust with a spade and found three gigantic fungi, two as flat and big as a dinner plate and one more like a soup-plate. Even that was not all, for the family, who came running at my cries of alarm, found 32 more mushrooms, mostly small, standing deeply within the distal parts of the heap. We ate some for supper and very delicious they were. The whole heap is riddled with the white mycelia, like short lengths of cotton, so we hope the supply will continue. The present theory is that the rogue who sold us the manure—at three times its market price—got it second-hand from a mushroom farm.

* * *

I set out on my first tour of East Africa prepared for pretty well anything except a world film première. My visit to Nairobi coincided with the annual general meeting of the Kenya branch of the B.M.A., and the incoming president replaced the traditional presidential address with a film show—an idea that I can now recommend to harassed B.M.A. presidents at home. Of the two films shown, *Malaria versus D.D.T.*, which had just been completed by the Kenya Medical Department, appealed to me most. Taken by a local professional film unit, it is the story of how an epidemic of malaria in Kenya was brought under control by D.D.T. The cast are all natives or members of the Medical Department, and one of the latter provides a first-class running commentary. The most impressive scene shows a meeting of the villagers called to hear how spraying of their huts with D.D.T. will stop the epidemic. An impassioned speech by the district commissioner does not convince the sullen natives, and even when the entomologist eats a bowlful of porridge sprayed with D.D.T. to demonstrate its safety they are still not enthusiastic. All seems to be lost when a native who has seen service in Burma rises and carries the day by relating his personal experiences of the benefits of D.D.T. The film fades out happily on the procession of native assistants and donkeys, led by the entomologist on horseback, making for home with their task accomplished. With a native commentary this film is to be used for propaganda in Kenya, but with a little skilled cutting it would go down well on one of the big film circuits at home. It would give the film-goer a better idea of East Africa in a quarter of an hour than he would get from a couple of hours' reading, and I think he would be astonished at the rapid advances that have come about in darkest Africa in the last decade.

* * *

Research in Boston has progressed not only in medicine but also in the canine world. In one of the best residential suburbs I saw a dignified lady leading a small well-groomed and sedate-looking dog. Her dress and deportment were of the late Victorian era. In her left hand she carried an elaborately carved walking-stick and in her right the longest lead I have ever seen—18 ft. if an inch. At first glance I was puzzled by this pair, but as the trees and posts were passed I marvelled at their ingenuity and team-work. It was the long lead that provided the right time interval, so that neither the dog nor the mistress had to wait and the dignity of neither was upset. Not once did the long lead tighten; never did the dog appear to be striving to reach a post, and even if he did dally slightly over a particularly attractive post he still was not jerked off his tripod stance. What integration! One felt like crying out "Oh, well timed sir!"

* * *

Definition of a successful doctor: one who finishes his round with his case filled with grapes.

Letters to the Editor

ELECTRONARCOSIS

SIR,—In your issue of March 20 Dr. Garmany and Dr. Early describe their attempts to administer electronarcosis to 28 patients. On examining their figures, however, we find that 5 patients refused treatment and that in 6 other cases treatment was stopped for physical reasons. Thus 11 out of 28 patients did not complete the course. This is a large proportion, which does not occur when one has gained experience of the technique. We are led to believe that 17 cases completed the course, but no positive statements are made concerning 4. These 13 or 17 cases are a small number on which to base any conclusions.

In twenty months' experience, however, we have found that electronarcosis (1) is more effective than electroconvulsive therapy (E.C.T.), (2) has fewer side-effects such as headache, and (3) is reasonably safe.

There were already grounds for believing that electronarcosis would be more effective. There is evidence that the good effects of E.C.T. depend on the autonomic nervous changes during the coma stage.[1] Electric coma, in fact, with its flushing, sweating, and other features, bears some resemblance to insulin coma. If, then, the coma were to be artificially prolonged in a controllable manner as in electronarcosis, one would expect better therapeutic results. It is, however, necessary, as in surgical anæsthesia, to achieve the correct level. If it is too light, the patient makes voluntary movements and later complains that under treatment he has been unable to speak, has been suffering from air-hunger, and has seen flashing lights. This state, which one learns to avoid by gently raising the current, no doubt led to some of the authors' 5 refusals, which they count as failures. The correct level is shown by a fairly strong flexion at the elbows and often by a slight stridor. A watch is kept on pulse, respiration, and blood-pressure. Where too high a current is kept up, the patient shows signs of distress. There may be spasm of the glottis, preventing adequate passage of air, or an irregular pulse with the rate eventually rising to over 150 per min., a rising blood-pressure with the diastolic pressure reaching 130 mm. Hg, a dilated pupil, or extensor plantar reflex. By way of contrast with insulin-coma treatment, however, where one must inject glucose intravenously to abolish the coma, it is easy with electronarcosis merely to reduce the current at once.

Where the correct level is maintained there are greater autonomic changes than in E.C.T., as is evidenced by the higher blood-sugar and the higher lymphocyte-count, and by flushing, sweating, and pilomotor reaction. These are followed by a more profound subjective change in the next 24 hours. Patients have said: "This feels quite different from electroshock; the effect is more complete in removing the symptoms."

Although the therapeutic effects are superior, headache, malaise, and memory loss are usually less. One medical patient, for instance, said that he had been greatly upset by E.C.T. but did not mind electronarcosis at all. Another patient, who always had severe nausea and vomiting after E.C.T., had none with electronarcosis. We have seen patients enjoying a meal within 15 minutes of treatment, and Tietz [2] sends home some ambulatory cases half an hour after treatment. We would not advise this, but mention it to show how relatively little the patient can be troubled by electronarcosis. The reason for these mild effects is no doubt that instead of causing a sudden violent excitation of the brain cells, as in E.C.T., one starts from zero and takes 3 seconds to reach the required level. Similarly, all other changes of current are made gradually.

Animal experiments have shown that currents three times as great as those used in electronarcosis and given for longer than half a minute do not appear to cause irreversible cerebral changes.[3] Memory tests given by us before and after treatment have shown no deterioration. It is quite wrong to suggest that the apparent

1. Cerletti, U. *Riv. sper. Freniat.* 1940, **64**, 209. Delay, J. La Psycho-Physiologie de l'Electro-Choc. Paris, 1946.
2. Tietz, E. B. *J. nerv. ment. Dis.* 1947, **106**, 150.
3. Globus, J. H., van Harreveld, A., Wiersma, C. A. G. *J. Neuropath. exp. Neurol.* 1943, **2**, 263.

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improvement may be due to cerebral damage preventing the patient from expressing himself in his usual psychotic way. In a favourable case the patient quickly recovers insight and feels better, so other therapeutic measures can then be employed. One cannot of course exclude the possibility of occasional idiosyncrasy with more severe memory disturbances—e.g., in those lacking vitamin B.

We would emphasise the importance of thorough atropinisation (gr. $^1/_{60}$) to lessen salivary and bronchial secretions and to counter the vagotonic phase, when there is cardiac and respiratory inhibition.

The complications which led to the cessation of treatment by Garmany and Early were :

1. *Hæmoptysis.*—We have encountered this complication once in E.C.T. but never in electronarcosis. In this single case it took place during the stage of apnœa owing to the rupture of a small vein ; and it is, we think, less likely to occur if oxygen and curare are employed.

2. *Confusion and clouding of consciousness.*—This is a relatively unimportant complication. Serious forms can be avoided by merely spacing out the treatments, and in any case so many patients have made a perfect recovery after it that some observers have thought that it has therapeutic value.

3. *Circulatory collapse.*—The physician watches the pulse and blood-pressure throughout, and if the diastolic pressure rises unduly, or if the pulse-wave becomes feeble or very rapid, the current can be either reduced or, in severe cases, cut ; on the next occasion the patient can be given curare. We have treated a man of 73 and a case of mitral stenosis in this way without ill effect.

In dealing with such serious cases of psychosis, we cannot claim that any treatment is free of risk.

The only case in which life was possibly shortened by the treatment was that of a 42-year-old woman who had had attacks of mania and melancholia with no intermission for 14 years. Two courses of E.C.T. had failed at different times. She was now melancholic with menopausal symptoms. Her father was in a mental hospital with chronic depression. The husband at that stage refused to allow a leucotomy. As we had had a striking recovery with electronarcosis in a similar case, we gave 9 treatments, after which she became apparently normal but then developed increasingly acute mania, without neurological signs, and died of pneumonia 12 days later.

Twenty months' experience has confirmed our first favourable impression of the treatment. One schizophrenic has become symptom-free with electronarcosis after 60 insulin comas had failed. In 6 out of 14 cases of schizophrenia where E.C.T. had failed, electronarcosis effected a recovery, while in 3 more the response was better than with E.C.T. alone. It is possible of course that previous E.C.T. favours a good result from electronarcosis. About a dozen cases have already been saved from a leucotomy, through the success of electronarcosis where other measures had failed. Two articles are at present in the press.[4]

We have hitherto withheld publication of our results since we desired first to perfect our technique and also to allow sufficient time to see whether our successes were permanent. We are confident, however, that further reports will show that E.C.T. is not the last word in electrocerebral treatment and that electronarcosis marks an important therapeutic advance in a particularly difficult field of medicine.

Psychiatric Unit, West London Hospital, W.6. A. SPENCER PATERSON
GLYN DAVIES.

SIR,—I have read with interest the article by Dr. Garmany and Dr. Early, but I am somewhat surprised that the authors should make such dogmatic statements on the basis of only 28 cases, 6 of which did not complete the treatment owing to the "complications" and a further 5 of which apparently refused treatment.

In this hospital we have had fairly considerable experience in the application of electronarcosis, but I have up to date purposely refrained from publishing results as it seemed to me inadvisable to draw conclusions from our rather small number of cases. We have now treated over 100 patients, the majority being schizophrenics ; and it may be of interest to record that in the original series of 20 cases [1] complete remissions were produced in 12 patients, all of whom have been back at work for periods ranging from a year to eighteen months.

As regards complications, it would seem that if cardiac collapse took place in 7 cases the technique used by Garmany and Early must definitely be questioned. In over 1100 treatments we have had 2 cases of cardiac collapse ; neither of these gave any cause for anxiety except for a few minutes, and one of them was a man of 75 who had been curarised. One patient had a slight hæmoptysis after the second treatment and, as in the case described by the authors, radiography and extensive clinical examination failed to reveal the reason for this. On the other hand, this man was in the midst of an acute schizophrenic episode, and after allowing a week to elapse electronarcosis was again instituted and 14 more treatments were given. The patient was rendered symptom-free and was enabled to travel back to his own country by air.

It is doubtful whether "clouding of consciousness" can be regarded as a complication. On the basis of over 2000 cases treated by intensive E.C.T. I am personally certain that confusion has a definite therapeutic value ; but whether one agrees with this or not there is no evidence whatsoever that the confusion has any permanent after-effects. As far as I am concerned, the dangers in the use of electronarcosis are infinitesimal compared with those associated with deep insulin therapy even given under the best of conditions. I have seen several cases which have definitely deteriorated after treatment with insulin, but hitherto I have not noted any comparable adverse change after treatment by electronarcosis.

It will obviously take several years before any true assessment of the value of electronarcosis can be made, but I hope within a relatively short time to be able to publish the results of two years' experience in the use of the method. I may add that although we have achieved fairly satisfactory results in the treatment of schizophrenia with intensive E.C.T., I certainly consider that electronarcosis is an advance ; and it is already proving, in this hospital at least, a useful adjunct to E.C.T.

St. James Hospital, Portsmouth. W. LIDDELL MILLIGAN
Deputy Physician-Superintendent.

HEALTH CENTRES

SIR,—In your issue of March 13 you note with proper disapproval that "hardly anything is now said about the Central Health Services Council, which was intended to be the very keystone of professional freedom under the Act." Mr. Bevan's consistent avoidance, from the moment of taking up office, of any direct negotiation with the profession is in keeping with this attitude to which you draw attention.

But there is another "keystone" (so described by the Minister) upon which all the arrangements for reconstruction of the health services depend—namely, health centres. Within four months of the appointed day for the inauguration of the Health Service under his Act, Mr. Bevan, without notifying the profession and without consultation with it, issued, on Jan. 14, circular 3/48, announcing that "owing to the building situation" the provision of health centres must be indefinitely postponed. Perusal of the circular reveals the amazing fact that the Minister has given no thought to the design or aims of this fundamental provision, and he further expressly cautions the local authorities that they must not submit proposals to him for their provision but must await the result of "intensive research" on their design, to be conducted by a special committee which he proposes to appoint at some future indefinite date.

Provision of health centres was one of the most attractive promises of the Bill in its passage through Parliament. It manifestly necessitated a considerable building programme, but in an answer to me (Feb. 10) when I asked what arrangements he had made to replace the health centres thus indefinitely postponed, he made the astonishing statement : "No immediate substantial increase of building work under the Act *has ever been promised or regarded as feasible*" (the italics are mine). By thus eliminating health centres in any foreseeable

4. *Edinb. med. J.* and *J. belge Neurol. Psychiat.*

1. Paterson, A. S., Milligan, W. L. (*Lancet*, 1947, ii, 198.

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future, Mr. Bevan has alienated the younger doctors whom the centres were to provide with full professional equipment, including surgeries, waiting-rooms, domestic, clerical, and nursing staff, increased accessibility to institutional and specialist treatment, and many other amenities; these the young doctor must now find for himself. It is not, therefore, surprising that the young doctors have expressed disapproval of the Act in the large proportion of 88 %.

Mr. Bevan is under no illusion, as you would seem to be, that the passage of an Act of Parliament automatically entails its implementation. In the final peroration of his speech on the third reading (*Hansard*, July 26, 1946) he made the significant admission that "The House of Commons passes Bills, but it is the men and women outside who can make them living realities"; and he added that "without the coöperation of the medical profession, this scheme must fail."

How entirely helpless a government really is when it tries to establish a medical service in face of the opposition of those who are required to work it is demonstrated by the Australian experience. Some four years ago a Health Service Act very similar to the Bevan Act was passed by the Labour government in Australia. The Australian profession refused to take service under it, and after unsuccessfully essaying several expedients to enforce its provisions the Australian government, I am informed, is now proceeding with an entirely different scheme in close coöperation with the medical profession. Mr. Bevan would be wise to follow this example.

House of Commons. E. GRAHAM-LITTLE.

CLICKING PNEUMOTHORAX

SIR,—The diagnosis of clicking pneumothorax in the case reported by Dr. Black on March 13 would seem open to question. Most of the cases reported in the literature had clicks audible on auscultation, and the patient was not necessarily aware of the click himself. In Dr. Black's case, however, the diagnosis depends entirely on the subjective sensations of the patient, and in view of the very unusual features presented by this case—namely, the absence of either a cardiac or a respiratory relationship, and the presence of the click on the right side—it would seem that the diagnosis must be made with some reserve.

If, however, Dr. Black's case is a true example of clicking pneumothorax, I would like to suggest that it was produced by the motion of walking causing the far collapsed lung to be impelled against the anterior thoracic wall and so producing the sound; thus the mechanism would be analogous to that suggested in explanation of the sound on the left side.[1]

Preston Hall, Maidstone. WALLACE FOX.

CERVICAL-ROOT IRRITATION

SIR,—In your issue of March 6 Dr. Kelly discusses the problem of pain in connexion with cervical-root irritation. He claims that the picture described by Dr. Milner (Dec. 13) has never been wholly confirmed by clinical or pathological evidence. I would like to draw your attention to the fact that, as far as the similar process in the lumbar region is concerned, it has now been established beyond doubt that root pressure is the cause of pain in cases of herniated intervertebral disc.

In a patient with shoulder pain of sudden onset with radiation down to the elbow it will often be found, especially in the early stage of the condition, that the pain has the following characteristics: it is localised and has the definite character of a root irritation; there is hyperæsthesia in the C4–5 area; the deep reflexes of the arm may be exaggerated, and the abdominal reflexes of the corresponding side are reduced. Compression of the cervical column by bending the head towards the side of the pain with slight pressure on the top of the head produces the distinctive pain in shoulder and arm. This can also be provoked by compression of the jugular veins (Naffziger). In other words, typical signs of root pressure are elicited by procedures which increase the protrusion of the herniated disc.

The pain may eventually lead to contracture of the shoulder and the typical picture of "humeroscapular periarthritis." The accumulation of calcium often found in this condition may be explained by the observation of Blumenthal that anoxia leads to rapid degeneration with secondary deposition of calcium. The anoxia in this condition may be due to reflex arterial constriction. Further investigations along these lines are warranted.

Oslo. JENS DEDICHEN.

1. Fox, W. *Lancet*, Feb. 7, p. 210.

MEDICAL LIBRARIES

SIR,—Dr. Avery Jones, in his informative address published in your issue of March 20, rightly observed that one of the full-time specialists' needs is "good library facilities"; yet he suggests nothing more than "some part-time clerical assistance." This is the more remarkable as Middlesex has a well-established reputation for having organised a library service for patients under public library auspices. There is similar scope for the professional reading of doctors, nurses, radiographers, physiotherapists, and almoners to have the valuable supervision of a medical librarian holding the special certificate of the Library Association.

London, S.E.24. C. E. A. BEDWELL.

PURCHASE-TAX ON DRUGS

SIR,—May I suggest through your columns that at the next Budget debate all medical Members of Parliament, irrespective of party, should ask the Chancellor to remit the tax on medicines other than "patent medicines"? The present position is anomalous. On a prescription dispensed by a chemist there is no purchase-tax; but on the same medicine if prepared by a manufacturing chemist there is a purchase-tax. I suggest that the tax be remitted on all medicines and drugs advertised only to the medical or pharmaceutical professions in recognised medical or pharmaceutical journals. That would leave a purchase-tax on all drugs and medicines advertised to the public in the lay press or elsewhere.

Furthermore, as the low birth-rate for the past half century is the primary cause of our lack of man-power, now so acute that we cannot live without importing foreign labour, it is not unreasonable to suggest that the time has come for a purchase-tax on contraceptives. The profits in this trade are enormous. The *Journal of the American Medical Association* stated in 1938 (**110**, 513) that condoms retailed at 16½ cents were manufactured for 1½ cents. Figures for Britain are not available, but the percentage of profit is not likely to be less.

London, W.8. HALLIDAY SUTHERLAND.

ASSISTANT DISPENSERS

SIR,—I am from time to time asked what is to be the position of assistant dispensers under the new Health Service, and shall be grateful if you will allow me, through your columns, to clarify the position in so far as this is at present possible.

The Act lays down that "nothing in this Act shall interfere with the rights and privileges conferred by the Apothecaries Act, 1815, upon any person qualified by that Act to act as an assistant to any Apothecary in compounding and dispensing medicines." With the taking over of the hospitals it is anticipated that the staffs will continue in their existing posts and it is thought that many health centres will employ holders of the assistant's certificate. It cannot yet be known how many doctors will continue to dispense their own medicines, but at the present time the demand for assistant dispensers far exceeds the supply.

Apothecaries' Hall, Black Friars Lane, London, E.C.4. ERNEST BUSBY Clerk.

THE TEACHER'S INCOME

SIR,—Your annotation on March 6 contained the statement that the medical teacher's income of £1500 to £2000 a year "is the kind of income which will be earned by all but the younger and less successful general practitioner." This is the type of comment which one has become used to reading in the less-informed type of lay newspaper, and I am waiting for someone to correct the ignorant. But to read it in THE LANCET is astonishing. The general practitioner will have a gross income such as you mention, but out of it he will find, and maintain, his own car, his own premises, his own clerical and domestic help, and his own telephone bill; and he

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will also buy his own instruments. From the balance sheets prepared by our accountants for the last 18 years, my husband and I calculate that we shall have a net income under the proposed scale of payment of, at the most, £1200—i.e., £600 a year each. After 24 years of experience this is shattering and discouraging. We have no quarrel with the principle of your argument that medical teachers should have incomes comparable with what they could earn in the best type of consultant practice. But we do ask you to make it clear that the general practitioner's income in the National Health Service is gross; the better equipment the general practitioner uses and the better the type of work he does, the higher his expenses and the lower his income. It is because the more energetic, enterprising doctor, by old standards, will be worse paid than the "aspirin or hospital" merchant whose chief instrument is the fountain-pen, that many of the more enthusiastic doctors have voted in the plebiscite against service under the Act.

Ruthin. ENID HUGHES.

*** The general practitioner's income has always been estimated as a gross income from which considerable practice expenses had to be met. These in future may be proportionately less, when the State becomes responsible for a larger share of the dispensing and supply of drugs. The rural practitioner will be helped by a much-increased mileage fund (double its present global size) without incurring a proportional increase in his travelling time or expenses. If, in spite of this increased mileage, and of the basic payment of £300 to each partner, practices such as that of Dr. Hughes and her husband were found (because of sparsity of population), to be hard hit by the new arrangements, it is certain that they would also qualify for special assistance from the special "inducement fund" of £400,000 per annum.—ED. L.

THE NICOTINIC-ACID TOLERANCE TEST

SIR,—In the *British Medical Journal* (1947, i, 822) and again in the *Lancet* (March 6) Dr. Erdei has published observations of an increased tolerance to the vasomotor effect of nicotinic acid in persons suffering from certain liver diseases.

There are a number of statements on the theoretical foundation of the test which need amendment. In his first paper Dr. Erdei quotes the low "response" of pellagrins to ingested nicotinamide described by Ellinger and Hardwick,[1] and he relates this to the "vasodilatory response" to ingested nicotinic acid. He overlooks that the "response" discussed by Ellinger and Hardwick was the portion of ingested nicotinamide eliminated in urine as nicotinamide methochloride. Further, he wrongly states that these workers observed an increase of nicotinamide methochloride elimination after methionine administration in pellagrins only. Methionine is efficient as soon as the store of available methyl groups is exhausted by continuous administration of large doses of nicotinamide, and the methionine effect is certainly due not to its sulphur content but to its available methyl groups. It can be replaced for this purpose by choline, but not by cystine. I agree with Dr. Erdei "that much more work has to be done before the rôle of the liver (and that of the kidney) in the nicotinamide metabolism will be understood." But a considerable amount of work of this kind has been done of which Dr. Erdei seems to be unaware. He begins his second paper with the following incorrect statements:

1. "Nicotinic acid given by mouth is converted in the liver into nicotinamide by aminisation of the CO.OH group into $CO.NH_2$."

2. "The quantity of nicotinic acid in excess of the liver's aminising capacity reaches the systemic circulation and causes vasodilatation."

3. "The nicotinic-acid tolerance test (N.T.T.) indicates the aminising capacity of the hepatic parenchyma."

1. From the work of Perlzweig et al.[2] and Ellinger[3] it is known that the liver is unable to aminate nicotinic acid. The amination occurs in kidney and brain[3]; the nicotinamide is then methylated to nicotinamide methochloride in the liver[2 3] and perhaps to 1-methyl-3-carboxylamide-6-pyridone.[4 5] The extent of nicotinamide formation depends on nicotinamide intake and storage, available methyl groups, and intactness of the methylating mechanism of the liver.[6]

2. One has to replace the words "liver aminising capacity" by "liver methylating capacity" to describe the real function of the liver in nicotinic metabolism. The nicotinic acid administered by mouth reaches the systemic circulation and causes vasodilatation long before the methylating capacity of the liver is exhausted. The flushing of forehead and neck starts a few minutes after ingestion. It is, therefore, not due to excess nicotinic acid.

3. The N.T.T. can thus not indicate the "aminising," say methylating, capacity of the liver. That liver dysfunction influences the nicotinamide metabolism has already been demonstrated[6 7]; and the influence of experimental liver damage on the elimination of nicotinamide methochloride in the rat has been studied.[3 8]

The whole N.T.T. is not easy to explain. The vasomotor effect is certainly due to nicotinic acid circulating in the blood. Nicotinamide, into which nicotinic acid is converted quickly in man,[9] does not cause any considerable flushing, and the conversion is not connected with the intactness of liver tissue. If the vasomotor effect is really influenced by liver damage the phenomenon has to be explained in a different way. The effect certainly depends on the general vasomotor lability of the individual; and this lability may possibly be decreased in certain liver diseases—a problem which needs investigation.

Lister Institute of Preventive Medicine, London, S.W.1. P. ELLINGER.

GERONTOCRACY IN OUR TIME

SIR,—The following is from the official report of the special representative meeting of the British Medical Association,[10] except that I have inserted in parentheses figures representing the ages of the gentlemen referred to, calculated (if otherwise unknown) on the generous assumption that they qualified at the age of 22:

"Dr. J. B. Miller (72), of Bishopbriggs, presided. He was supported by Dr. H. Guy Dain (77), the Chairman of Council, Sir Hugh Lett, Bt. (72), President, Dr. J. W. Bone (79), Treasurer, and other officers of the Association."

After two congratulatory motions had been passed Lord Horder (77) referred to a Cabinet Minister who "spoke of the Negotiating Committee as a handful of elderly doctors dictating to the profession. In the public interest it seemed desirable to nail these lies to the counter. (Applause.)"

I am aware that the Negotiating Committee and the B.M.A. are two different bodies, but I presume that these men play a leading part in the formulation of B.M.A. policy. If not, they should no longer be officers of the association. On the same calculation Sir Ernest Graham-Little is at least 78.

Those who criticise their elders and betters do so at the risk of being considered ill-mannered, but there are times when it seems to me that someone must be willing to take such a risk and plead for leadership by those who at least will have some part to play in the running of the new Health Service. I well realise that there are exceptional men whose ability and judgment remain unimpaired long after the normal age of retirement, but I shall not believe that it is right for them to play an active part in *leading* the profession in times such as these until I hear of my colleagues on hospital and university staffs clamouring for the age of retirement to be raised to 80 (or even 70). So far no murmurs of such an agitation have reached my ears.

By all means let us behold (and cast out if possible) the mote of bureaucracy in the National Health Service,

1. Ellinger, P., Hardwick, S. W. *Brit. med. J.* 1947, i, 672.
2. Perlzweig, W. A., Bernheim, M. L. C., Bernheim, F. *J. biol. Chem.* 1943, **150**, 401.
3. Ellinger, P. *Biochem. J.* 1947, **41**, XIX; *Ibid* (in the press).
4. Knox, W. E., Grossman, W. I. *J. biol. Chem.* 1946, **166**, 391; *Ibid*, 1947, **168**, 363.
5. Rosen, F., Perlzweig, W. A., Handler, P. *Fed. Proc.* 1948, **7**, 181.
6. Ellinger, P., Coulson, R. A. *Biochem. J.* 1944, **38**, 265.
7. Ellinger, P. *Nature, Lond.* 1945, **155**, 319.
8. Perlzweig, W. A., Huff, F. W., Rosen, F. *Fed. Proc.* 1946, **5**, 149.
9. Ellinger, P., Abdel Kader, M. M. *Biochem. J.* 1948 (in the press).
10. *Brit. med. J.* March 27, suppl. p. 49.

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but let us at the same time consider the beam of gerontocracy in our own profession.

Department of Medicine,
The Royal Infirmary, Manchester. ROBERT PLATT.

CHRISTIAN MEDICAL GROUP

SIR,—Founded over fifty years ago, the Medical Prayer Union has sought in various ways to foster fellowship among Christian doctors. It has organised the missionary breakfast at the annual meetings of the British Medical Association, and another for medical students, every year, in the spring. It would seem from many points of view that the time is opportune to link medical men and women in some more effective way in order to promote and maintain a distinctive Christian witness in what is tending to become an increasingly secularised and nationalised service and to foster and support the medical missionary activities of the Church at home and overseas. Will any interested send me their suggestions regarding such a "Christian Medical Group"?

South End Cottage, Turville Heath, Henley-on-Thames. NEVILLE BRADLEY
Hon. Secretary,
Medical Prayer Union.

Medicine and the Law

Getting the Patient's Consent

Is it necessary from time to time to remind medical practitioners of the need to obtain a patient's consent to his or her treatment or examination? If so, guidance will be found in a statement recently issued by the council of the Medical Defence Union. The document will save them time. It concentrates information otherwise to be sought in widely scattered legal decisions.

One can go back, for example, to the case of Slater *v.* Baker in 1767, where an eminent surgeon on the staff of St. Bartholomew's Hospital was sued along with an apothecary for "unskilfully disuniting the callous of the plaintiff's leg after it was set." Medical advice varied between compression and extension of a crooked limb. One witness declared that Mr. Baker had used "a big steel thing that had teeth and would stretch or lengthen the leg." This, it seems, was a new instrument and the court was pressed with the argument that, before a patient was experimented upon, he ought to be asked for his permission. "It is reasonable that a patient should be told what is about to be done to him, that he may take courage and put himself in such a situation as to enable him to undergo the operation." The much more modern case of Beatty *v.* Cullingworth in 1896, where the patient had consented to the removal of one ovary but had expressly forbidden the removal of both ovaries, is an important reminder that surgery in respect of the reproductive organs is specially likely to raise this type of problem. Records show that patients have brought actions against practitioners where X rays have been employed, or even where chloroform has been administered for a dental extraction, without consent.[1]

Mere medical examination is a trespass—i.e., an assault—unless the patient gives leave. Nearly fifteen years ago Mr. Justice Rigby Swift declared emphatically that a police surgeon has no right to apply tests for drunkenness without the motorist's permission. The official instructions to the Metropolitan Police, when recommending that medical examination be made in cases of sexual offences such as rape, are careful to give warning that the accused must be told of his right to object. Special considerations arise in the cases of husbands and wives, of minors or of mental patients, or (as the long litigation in Latter *v.* Braddell showed in 1881) where a mistress asks a doctor to examine a domestic servant. If practitioners do not feel confident of finding the right answers, they had better consult the document which the Medical Defence Union has, with expert legal help, prepared. It is true that, in litigation of this kind, initiated by patients, the doctor has often successfully resisted claims for damages. But medical life has little time for lawsuits, triumphant or otherwise. The profession will prefer, in the terms of the Boy Scouts' motto, to "be prepared."

1. *Lancet*, 1903, i, 1067.

Parliament

QUESTION TIME

Terms of Service

Sir WAVELL WAKEFIELD asked the Minister of Health if he was proposing under the National Health Scheme that medical practitioners would be entitled to a five-day week, with extra pay for overtime, Sunday work, and night work, together with danger money when attending infectious disease, for inclusion in their terms of remuneration.—Mr. ANEURIN BEVAN replied: The terms of service for general practitioners under the National Health Service are set out in the National Health Service (General Medical and Pharmaceutical Services) Regulations, 1948, which are now before Parliament.

Mrs. JEAN MANN: Could not the Minister consider adding the question of payment by results?—No further reply was given.

Provision of Services

Mr. A. C. BOSSOM asked the Minister if he was yet satisfied that he would be able to provide the medical services proposed in the new Health Service Act.—Mr. BEVAN replied: I certainly see no reason why the service should not start in the manner always contemplated.

Payments for Industrial Accidents

Mr. THOMAS BROWN asked the Minister of National Insurance what steps he proposed to take to bring persons entitled to payments under the Workmen's Compensation Acts in respect of industrial accidents or disease occurring before the appointed day within the new Industrial Injuries Scheme.—Mr. JAMES GRIFFITHS replied: The Act enables unemployability supplements and constant attendance allowances of substantial amount to be paid from the appointed day to these persons in appropriate cases, and I shall be making an announcement about applications for these allowances towards the end of May. Beyond this the Act does not apply to these cases, and much as I would like to do so I have not, as yet, been able to formulate any proposals for bringing them in. The principles on which the new benefits are based are so different from those underlying Workmen's Compensation that it would not be practicable in advance of experience of the actual working of the new Act either to transfer existing cases to the new scheme automatically or to require the persons concerned to elect whether to come in to the new scheme or to remain on Workmen's Compensation. There would, moreover, be great difficulty, at this stage, in arriving at an equitable arrangement regarding the sums to be paid by employers and insurers in respect of the liabilities under the Workmen's Compensation Acts of which they would be relieved. I realise, however, that uncertainty in this matter cannot be allowed to continue indefinitely. I therefore propose to look at it again as soon as we have sufficient experience of the working of the new scheme, and I hope to be able to reach a final conclusion one way or the other by the middle of next year.

Admission to National Insurance

Mr. P. L. E. SHURMER asked the Minister what arrangements were being made for the admission to the National Insurance scheme of persons who were not at present insured.—Mr. GRIFFITHS replied: As from April 5 forms of application for National Insurance contribution cards, which are to be stamped from July 5, will be obtainable from post-offices, employment exchanges, and local National Insurance offices. Everyone liable to pay contributions under the National Insurance scheme and not at present insured should complete one of these forms and send it as soon as possible and before April 24 to the nearest employment exchange. Information as to the persons who should apply, and those who may be excepted, will appear in the press shortly before April 5. Explanatory leaflets will be available at exchanges and the local offices of my department.

Supplies of Streptomycin

Mr. H. W. BOWDEN asked the Minister of Health if streptomycin was now being produced in the U.K.; if supplies were still being imported; and what stocks were now held in the U.K. in comparison with the nearest convenient date in 1947.—Mr. BEVAN replied: Production on a small scale will start shortly but imports are still necessary. Stocks were 25 kg. on Sept. 1 and 36 kg. on March 1.

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Coöperation

Sir THOMAS MOORE asked the Minister of Health if he had taken note of the decision of the British Medical Association on March 17 not to enter the new Health Service on July 5 unless substantial changes were made in the Acts; and what further steps he proposed to take in the matter.—Mr. BEVAN replied: Yes, Sir. On the latter part of the question I would refer the hon. Member to the reply [1] which I gave on Feb. 19 last.

Mr. A. C. BOSSOM asked the Minister what steps he proposed to bring into operation the new Health Service without the coöperation of the medical profession.—Mr. BEVAN replied: I cannot accept the assumption underlying the question.

The Milk We Drink

Mr. SOMERVILLE HASTINGS asked the Minister of Food what was the average consumption of liquid milk per head in England and Wales in 1938 and 1947, respectively.—Mr. JOHN STRACHEY replied: The average consumption per head is estimated at 3 pints per week in 1938 and $4^5/_8$ pints in 1947, an increase of over 50%.

Dangerous Drugs Left in Doctors' Cars

Mr. PETER FREEMAN asked the Home Secretary how many cases had occurred during the last year of dangerous drugs being lost or left by doctors, unprotected in cars or elsewhere, and reported to the Metropolitan Police.

Mr. CHUTER EDE replied: The records of the Metropolitan Police show that 4 losses and 60 thefts of this nature were reported in 1947. Mr. FREEMAN: Would not this be a very good time for the Minister to suggest to doctors that they should be very careful what they do?—Mr. EDE: Far be it from me to get involved in a controversy with doctors.—Mr. SOMERVILLE HASTINGS: Does the Minister realise that doctors have been very much engrossed with political and other considerations during recent months?

Public Health

Mental Health Services under the Act

A BOOKLET on mental health services has been compiled by the Ministry of Health for the benefit of those administering these services under the National Health Service Act. The booklet is designed to explain the changes in organisation under the Act, and the effect of its amending provisions upon the already complicated provisions of the Lunacy and Mental Treatment Acts and the Mental Deficiency Acts.

In a circular (29/48) the Minister of Health announces the transfer, on April 1, to the Welsh Board of Health of local responsibility, subject to over-all supervision by the Ministry and the Board of Control, for the following functions: (1) examination of plans of buildings, other than patients' accommodation, for mental hospitals and mental-deficiency institutions; (2) furnishing and equipment of mental hospitals and mental-deficiency institutions; (3) building priorities; (4) nurses, nursing, and training; (5) domestic staffing; (6) dietaries; (7) clothing; (8) infectious diseases and infestation; (9) approval of doctors under the Mental Treatment and Mental Deficiency Acts; and (10) relations with voluntary associations in these connexions.

Welsh Tuberculosis Services

On March 17 Mr. Aneurin Bevan, the Minister of Health, received representatives of the Welsh Regional Hospital Board, including Sir Frederick Alban (chairman) and Prof. R. M. F. Picken, M.B. (vice-chairman), to discuss the proposal of the regional board to set up a separate hospital management committee to administer the tuberculosis service in Wales and Monmouth. The Minister took the view that the proposal did not entirely conform with the intentions of the Act, and made alternative suggestions with a view to entrusting the day-to-day management of the tuberculosis institutions to the respective local management committees while continuing certain central functions under the ægis of the regional board.

1. *Lancet*, Feb. 28, p. 348.

Whooping-cough and Measles Notifications

Under the Measles and Whooping Cough Amendment Regulations, 1948, the fee payable to private practitioners for notifying these conditions is to be raised from 1*s.* to 2*s.* 6*d.* from April 1. This brings the fee for notifying these two disorders into line with that paid for notification of other infectious diseases.

Vaccination Requirements in Somalia

Anyone entering Somalia (previously Italian Somaliland) from Egypt, India, or Pakistan must now produce a medical certificate showing that he has received a second inoculation against cholera not more than six months or less than six days before his date of entry. People passing through the territory by air who cannot produce such a certificate will be medically examined for signs of cholera before being allowed to proceed.

Poliomyelitis in 1947

The "corrected" notifications of poliomyelitis and polioencephalitis in England and Wales during last year are likely to number between 7500 and 7600, giving an attack-rate of about 18 per 100,000 population. This rate cannot easily be compared with that for 1938, the year with the highest recorded incidence up till 1947, because corrected notifications were not issued at that time; but according to notifications made in that year, which would presumably have been fewer if corrected, the attack-rate was then 3·8 per 100,000 population.

In an attempt to gauge the form and severity of the 1947 outbreak, Dr. W. H. Bradley and Dr. A. H. Gale,[1] of the Ministry of Health, sent out a questionary to hospitals; and in this way they obtained information of 4717 cases admitted and confirmed up to Oct. 11. This large sample includes, by their reckoning, some 76% of all corrected notifications.

A third of the patients were under 5 years of age, a third between 5 and 15, and a third over 15. Of the deaths, however, only 14% were in children under 5, while 21% were in children between 5 and 15 and no less than 65% in patients over 15.

Of the 4717 confirmed cases, 63% had paralysis affecting chiefly the limbs or trunk, 10·3% had paralysis affecting chiefly cranial nerves, and 23·3% had no paralysis. Among the 1097 cases in this last group, the diagnosis was made in 769 on changes in the cerebrospinal fluid and in 328 on clinical grounds. In a further 3·4% of patients symptoms and signs were indefinite, but the diagnosis was made because of close contact with a definite case.

Of the 3461 paralytic cases 333 were fatal, while of the 3128 cases in which the patient recovered 41·1% were classed as "mild," 38·5% as "moderate," and 20·4% as "severe." "Moderate" was taken to mean "likely to need a period of treatment in an orthopædic hospital but with a good prospect of an ultimate return to normal life"; "severe" meant "unlikely to return to normal life." In all, there were 1843 survivors in the moderate and severe classes and their age-grouping was as follows:

Age	*No.*	%
0 –	102	5·5
1 –	586	31·8
5 –	588	31·9
15 –	295	16·0
25 –	192	10·3
35 –	68	3·7
45 +	12	0·7

Judging by this sample, some 40% of cases, or 3000 patients, will need long-stay hospital treatment as the result of the 1947 outbreak. About a third of these are likely to be under 5, a third between 5 and 15, and a third over 15, with a preponderance of males over females of about 5 to 4. The severely crippled may number about 1000.

Altogether, 310 patients were treated in respirators; of these, 217 were treated temporarily while 93 were likely to need such treatment permanently. From the sample there is no evidence of a relatively increased incidence in pregnant women.

1. *Mon. Bull. Min. Hlth, P.H.L.S.* 1948, 7, 56.

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Obituary

HUBERT JAMES NORMAN

M.B. EDIN., D.P.H.

Dr. H. J. Norman, superintendent of Camberwell House and a vice-president of the Royal Society of Medicine, died in London on March 13 at the age of 67. He was born in Devon, where his father, Dr. J. H. Norman, had a moorland practice at Winkleigh, but his school days were spent in Edinburgh, and he qualified from Edinburgh University in 1905. As a student he played rugby and later he became a good squash and lawn-tennis player.

After he qualified he acted for a time as assistant to Alexis Thomson, then surgeon to the Edinburgh Royal Infirmary, but Clouston's lectures at Morningside attracted him to the study of morbid psychology, and after holding two temporary posts in mental hospitals he joined the staff of Camberwell House in 1908. Later he became lecturer in mental disorders at the Westminster Hospital, and in 1925 he succeeded Dr. F. H. Edwards as superintendent at Camberwell. His old chief writes: "Probably no man had a greater knowledge of evolution in the treatment of insanity than Norman, and he will be remembered for his fine balance of judgment. He carefully weighed the pros and cons and never jumped at a conclusion, and as an expert witness his testimony was valued by the courts. Norman never spoke evil of anyone; he was modest of himself and eulogistic of others."

Besides acting as a vice-president of the Royal Society of Medicine, Norman was president of the section of history of medicine, to which he had been secretary for eleven years, and he had also held these offices in the section of psychiatry. He had only lately retired from the presidency of the Society for the Study of Addiction. A keen bibliophile, he was an old member of the Authors' Club, where he met and held as friends many contemporary writers. He had written a good deal himself, and besides his *Manual of Mental Disorders* (1928) he had published papers on psychiatry in relation to biography and history, including studies of John Bulwer, Nietzsche, Blake, and Swedenborg. In an early paper he dealt with witchcraft, demoniacal possession, and insanity, and he continued his researches into demonology on which he planned to write further.

MAXIMILIAN WALTER GEFFEN

M.R.C.S., D.P.H.

Dr. Max Geffen died on March 24 at his home in Hampstead, where he had been in practice since 1938, though during the past two years failing health had limited the work he could undertake. In 1917 he qualified from University College Hospital, and for the remainder of the war he served in the R.A.M.C. After holding house-appointments at his old hospital, he took the D.P.H. in 1922 and became school medical officer for Bradford. Later, while in practice in Kensington, he became a Labour councillor of the borough and a member of the public-health committee.

After he turned to general practice Dr. Geffen continued his interest in public-health work, and he was for a time an assistant school medical officer of the L.C.C. He was also an examiner and lecturer on first-aid and home-nursing for the council. He was a medical officer to the bathing centre at St. Pancras, where his brother, Dr. D. H. Geffen, is M.O.H., and he reported his observations on scabies there in the *British Medical Journal* in 1944.

During the late war he was in charge of one of the first-aid posts in Hampstead, and no matter how fierce the blitz (a colleague recalls) Geffen and his wife would report for duty. "Max," he continues, "was well read and socially minded. Inclined to be quiet and retiring, he was a great lover of home life. In all I have never met a more kindly, thoughtful, and generous man."

Dr. Geffen is survived by his widow and by two sons of his first marriage, one of whom is Dr. T. J. B. Geffen.

Notes and News

OUTSIDE THE SERVICE

On March 25 in answer to a parliamentary question the Minister of Health announced that the following voluntary hospitals in the London area had been disclaimed from the provisions of the National Health Service Act:

French Hospital and Dispensary.
Italian Hospital.
British-Dental Hospital.
King Edward VII Hospital for Officers.
Royal Masonic Hospital.
Star and Garter Home, Richmond.
Scio House Hospital for Officers, Putney.
Hurlingham Lodge Auxiliary Hospital.
Hawthorne Christian Science House, Hampstead.
Stanborough's Hydro, Watford.
St. Andrew's Hospital, Dollis Hill.
Hospital of St. John and St. Elizabeth.
St. Vincent's Orthopædic Hospital, Pinner.
St. Saviour's Hospital.
St. Joseph's Institute, N.9.
St. Joseph's, E.8.
St. Anthony's Hospital, Cheam.
St. Veronica's, S.W.14.
St. Michael's, Worcester Park.
Hostel of St. Luke, W.1.
St. Raphael's, Brentford.
St. Raphael's Colony, Potters Bar.
Pield Heath House.
St. Teresa's, Wimbledon.
Hostel of God, Clapham Common.
Home of Compassion, Thames Ditton.
Convent of our Lady Nursing Home, Hillington Court.
St. David's Home, Ealing.
Etloe House, E.10.
London Clinic for Psycho-Analysis.
Catholic Nursing Institute.
Manor House.

The majority of disclaimed hospitals and institutions have now been notified, and the list for England and Wales already contains 179 names.

B.M.A. INDEPENDENCE FUND

The decision by the British Medical Association's representative body to establish an Independence Fund,[1] has been followed by an appeal for subscriptions in a letter circulated to the profession. The two main objects of the fund are explained as being:

1. The provision of financial aid to practitioners who may suffer hardships as a result of their loyalty to the cause of the profession.
2. The organisation centrally and locally, through Local Independence Committees to be set up throughout the country, of such steps as are necessary to unify the profession in its expressed determination not to accept service under the National Health Service Acts until such amendments are made as will preserve the freedom of the profession.

The National Insurance Defence Trust has decided to deposit with the fund an initial contribution of £400,000.

AFTERCARE FOR THE MENTAL PATIENT

The work of the Mental After Care Association, as Dr. Ian Skottowe said at the annual general meeting on March 22, fills a gap which cannot be filled in any other way. Mr. Justice Birkett, who addressed the meeting, remarked on the number of defendants he sees on whose behalf it has to be said that much of their conflict with the law is caused by mental trouble; and he thought it characteristic of our country that there is no work of social redemption to which people will not give money and service. At the Nuremberg trials he had been struck by the fact that one defendant, Frick, had been charged with the fact that as minister of health he had countonanced, and indeed ordered, that the old, the sick, and the mentally ill should be condemned to methods of destruction—a potent and sinister pointer to the quality of life in a totalitarian State. Our country may deserve much criticism, but at least for those who are sick or need help there is a fund of compassion which finds expression in such societies as this. Such associations derive, he said, from the quality of insight, the understanding heart, the discerning mind. This one was founded on the simple observation that when a patient left a mental hospital he often relapsed because he was not ready for the strain of ordinary life. The association completes and complements the work of the hospital, and its main purpose is the prevention of relapse.

Dr. Henry Yellowlees, chairman of the association, in presenting the annual report, said that the M.A.C.A. convalescent homes are active again and that last year 500 mental-hospital patients were given a holiday by the sea. Elmstead Lodge, which had been lent to the Polish government during the war and after, was returned in March, 1947, and is to be equipped and run as a model reablement centre. King Edward's Hospital Fund for London have made a special grant of £2500 towards the furniture and equipment of this centre, apart from their usual annual grant to the work of the association. The association is about to be

1. See *Lancet*, March 27, p. 495.

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incorporated as a limited liability company, for convenience in legal matters relating to the owning of property—a metamorphosis which Mr. W. P. King, the association's legal adviser, spoke of as an enharmonic change: "It is as though a man playing B flat is suddenly required by the conductor to play A sharp." The meeting took with equanimity the news that if the association suddenly collapsed the members will be liable for a sum of 5*s*. per head.

A COMPACT BEDSIDE LOCKER

PATIENTS often find hospital bedside lockers poorly suited to their needs. The Frances Louise locker has been designed by Miss Olive Matthews to place everything a patient needs within his reach. A specimen locker, which has been made by Messrs. Heal in birch wood cellulosed in powder blue, is 39 in. high, 18 in. wide, and 15 in. deep. It stands on large castors on short legs which give it a 7 in. clearance of the floor. The top has a surround on three sides which prevents objects slipping off, and a chromium ring holds a tumbler. The upper part is occupied by shelves which take out for cleaning, and are set at appropriate levels to take books, papers, and food. The bottom shelf is in the form of a tray containing toilet fixtures and a small bowl for washing. A plastic curtain can be drawn across the shelves. The bottom cupboard has a fall-forward door, and is large enough to take shoes. At the sides are two chromium towel rails, and a coat-hanger for a bed-jacket with a chromium rail above it for a shawl. Hooks are provided for workbags and other light objects. At the back of the locker a bed-table hangs on a bracket.

COMMISSIONS IN THE R.A.M.C.

THE War Office announces that the following can now be considered for appointment to short-service Regular Army commissions in the Royal Army Medical Corps for a period of 8 years, of which the first 4 years will be on the active list and the remainder on the Regular Army Reserve of Officers:

1. Civilian doctors, for direct appointment in the rank of lieutenant.
2. Released medical officers who have held a non-permanent commission in the R.A.M.C. during the present emergency and who were released before Oct. 24, 1947. For those with previous full-pay service as a medical officer for 12 months or more, appointment will be in the rank of captain; otherwise appointment will be in the rank of lieutenant.

At the time of application candidates must normally be not over 30 years of age, they must be British subjects whose parents are British subjects, and they must be registered under the Medical Acts. During their last 15 months of service on the active list, such officers will be considered for appointment to a permanent Regular Army commission. If they do not wish a permanent commission, or are not selected for one, they will receive a gratuity of £600 at the end of their 4 years' short service on the active list. Conditions of service and forms of application are obtainable from the Assistant Director-General, Army Medical Services (A.M.D.1), 38, Hyde Park Gate, London, S.W.7.

On the nomination of the Central Medical War Committee doctors are appointed to emergency commissions in the rank of lieutenant. During their period of service they can apply for a short-service Regular Army commission, and they can be subsequently considered for a permanent commission under the conditions already outlined.

University of Cambridge

On March 13 the following degrees were conferred:

M.D.—P. E. C. Manson-Bahr, R. D. S. Rhys-Lewis.
M.Chir.—R. N. Jones.*
M.B., B.Chir.—R. J. Dickson,* J. H. Inskip,* P. A. S. Hargrove.*
* By proxy.

Dr. D. Russell-Davis has been appointed lecturer in psychopathology, Dr. J. W. Millen, demonstrator in anatomy, and Dr. B. M. Herbertson, demonstrator in pathology.

University of Dublin

At a recent examination for the diploma in gynæcology and obstetrics the following were successful:

Rose Allos, J. A. Beggs, Mahmooda Chaudhury, Jacob Cohen, R. K. Das, Lakshmi Haldar, S. R. Hing, K. M. Issa, Arthur Joffe, A. K. Kantarjian, C. M. Meyer, A. M. Porter, Noora Ramadhani, Eamon Sheehan, S. M. Shukry, Arthur Skowron, E. M. Slattery, Nagib Sobhi, C. F. van den Steen, Mannie Stein, Ishac Youakim.

Royal College of Surgeons in Ireland

Mr. J. B. Dunlop and Mr. P. J. van Miert have received the fellowship of the college.

University of Liverpool

At recent examinations the following were successful:

M.Ch.Orth.—R. C. Anderson, K. T. Dholakia.

University of Leeds

At recent examinations the following were successful:

M.D.—H. S. Klein (with distinction); R. Goldberg, Henriette Lackner, A. A. Smith, Elizabeth M. Stokes.
M.B., Ch.B.—J. R. Bowker, E. W. Green, Kathleen Scott, J. H. Shoesmith, D. M. Williamson (with second-class honours); N. V. Addison, T. Barker, Joanne E. Boocock, Josephine J. Borman, J. D. Brackenridge, Elizabeth J. Brick, J. V. Chippindale, A. N. G. Clark, J. M. A. Critchley, Ilene I. Dunn, J. P. Falkingham, R. D. Haigh, R. I. M. Hepworth, R. High, T. B. Hogarth, A. J. Levine, T. K. Marshall, A. T. Merson, Joy A. R. Peniston, Sheila M. W. Pittock, M. S. Salinsky, D. M. Serr, W. M. Sutcliffe, K. H. Sykes, J. S. Washington, Isobel V. Watson, A. R. Webster, W. Wintersgill, Dorothy L. Wood.

University of Sheffield

Dr. Spyros Doxiadis has been appointed lecturer in child health, Dr. G. Wiseman, assistant lecturer in physiology, Dr. A. G. Macgregor, research assistant in the department of pharmacology and therapeutics, and Dr. A. H. Morris, demonstrator in anatomy.

University of Edinburgh

Prof. W. H. Newton, of Liverpool, has been appointed to the chair of physiology from Oct. 1.

Dr. Newton, who is 43, is M.D. and M.SC. of Manchester University, where, under Prof. H. S. Raper, he held the Platt physiological scholarship and a graduate scholarship. After a period as house-physician at the Manchester Royal Infirmary, he became Sharpey scholar in Prof. Lovatt Evans's department at University College, London, subsequently holding the posts of lecturer, senior lecturer, and reader, and receiving the D.SC. Lond. He has been an examiner in physiology at London and Cambridge, and acted for some years as visiting lecturer in physiology to the Chelsea Polytechnic and in applied physiology to St. George's Hospital. In 1937–38 he visited the United States as Rockefeller fellow in endocrinology, working in the late Prof. Edgar Allen's department at Yale University and at Wood's Hole. At the 50th anniversary of the American Physiological Society at Baltimore in 1938 he represented the Physiological Society, of which he is, with Dr. L. G. Brown, joint secretary. On the outbreak of the late war he became acting head of the physiology department at University College, and from 1939 to 1943 he was also subdean of the faculty of medical sciences. In 1944 he was appointed to the Holt chair of physiology at Liverpool. His experimental work has been chiefly concerned with the physiology of pregnancy. He edited the 5th and 6th editions of Lovatt Evans's *Recent Advances in Physiology* (1936, 1939), and this year he published his own *Introduction to Physiology*.

Royal College of Obstetricians and Gynæcologists

The council invites applications for two Leverhulme research scholarships of £500 a year.

The scholarships, which will be renewable for a second and third year, are to be awarded for research into problems connected with obstetrics and/or gynæcology. They may be held simultaneously with another appointment. Forms of application may be had from the secretary of the College, 58, Queen Anne Street, London, W.1. They should be returned by July 1.

Association of Surgeons of Great Britain and Ireland

At the annual meeting of the association, which is to be held in Edinburgh on May 6, 7, and 8, the main subjects for discussion will be Maintenance of Metabolism by Parenteral Methods, Diaphragmatic Hernia, Hypertension, and the Surgery of Pancreatic and Ampullary Neoplasms.

Royal Society of Arts

The next award of the Swiney prize will be made in January, 1949, for a work on medical jurisprudence.

The prize, which this year will be a cup of the value of £150 and the sum of £100, will be made by a joint committee of the society and of the Royal College of Physicians of London. Anyone who wishes to submit or recommend a work for consideration should send it to the secretary of the society, John Adam Street, W.C.2, not later than Nov. 30.

Scottish Appointment

The Scottish National Blood Transfusion Association and the Edinburgh Blood Transfusion Service have appointed Dr. R. A. Cumming to the joint position of regional director (South-east Scotland) and director of the association's central depot (eastern area) at Edinburgh, in succession to the late Dr. Douglas McRae.

Dr. Cumming, who qualified M.B. at Aberdeen University in 1933, was until recently Government pathologist and professor of pathology in the King Edward VII College of Medicine, Singapore. From 1935 to 1938 he held a commission in the Royal Air Force, serving as pathologist to the R.A.F. general hospital in Iraq. Later he joined the Colonial Medical Service's department of pathology at Singapore. Rejoining the R.A.F. in 1941, Dr. Cumming acted as senior medical officer and, later, as pathologist in Java, until he was taken prisoner by the Japanese in 1942. Until his release he worked on the Siam-Burma railway.

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Royal Institution of Great Britain

On Friday, May 14, at 9 P.M., at the institution, 21, Albemarle Street, London, W.1, Sir Ian Heilbron, F.R.S., will speak on the Rôle of Chemistry in Combating Tropical Diseases.

American Psychiatric Association

Dr. Daniel Blain, formerly chief of neuropsychiatric services for the Veterans Administration, has been appointed to the new position of medical director of the American Psychiatric Association.

Royal Sanitary Institute

At the meeting of the institute at Northampton on April 1, the programme included a paper by Dr. C. M. Smith on the Control of Infection in Day Schools, and a paper by Dr. C. G. Payton on the Water-supply of Northampton.

Institute of Hospital Administrators

The annual conference will be held at the Caxton Hall, Westminster, S.W.1, on Friday and Saturday, April 9 and 10. Sir Hugh Lett will open the proceedings on the 9th at 2.15 P.M., and the programme will include discussions on Hospital Administration in the National Health Service, and the Hospital Administrator's Conditions of Service, Training, and Qualification. Further information may be had from the secretary, Tavistock House North, W.C.1.

Human Factor in Industry

The British Association is holding a conference on this subject at Leamington Spa on Saturday, May 8. Sir Henry Tizard, F.R.S., president of the association and chairman of the Cabinet's advisory council on scientific policy, will preside at the first session, and Sir George Schuster, chairman of the Industrial Productivity Committee's panel on human factors, will be in the chair at the second. Further particulars may be had from the secretary of the association, Burlington House, Piccadilly, London, W.1.

B.C.G. Congress

The first International Congress on B.C.G. will be held in Paris from June 18 to 23, when the following subjects will be discussed: experimental investigation of B.C.G. and methods of administration; results of its use in human and veterinary practice; and its rôle in preventive medicine. During the congress a visit will be paid to Lille to celebrate the 50th anniversary of the Institut Pasteur, founded by Calmette. In its laboratories, with Guérin who is president of the congress, Calmette did most of the experimental work on the vaccine. The secretary-general of the congress should be addressed at the Institut Pasteur, 25, rue de Docteur Roux, Paris, XV.

Regional Hospital Board Appointments

Liverpool.—Dr. David Brown, chairman of Bootle health committee, has been appointed to the board in place of the late Dr. T. H. Harker.

Birmingham.—Dr. E. S. Stern has been appointed regional psychiatrist.

South-west Metropolitan.—Dr. Gerald Garmany has been appointed regional psychiatrist.

North-west Metropolitan.—Miss M. Marriott, matron of Middlesex Hospital, has been appointed to the board to fill the vacancy caused by the resignation of Miss Cockayne on her appointment as chief nursing officer to the Ministry of Health.

Army Medical Services

On April 1 Major-General Neil Cantlie succeeded Lieut.-General Sir Alexander Hood, G.B.E., as director-general of Army Medical Services.

General Cantlie, who is 55, is the third son of the late Sir James Cantlie, F.R.C.S., and was educated at Robert Gordon's College and the University of Aberdeen, where he graduated M.B. with honours in 1914. Entering the R.A.M.C. in July of that year, he served in France and Flanders, winning the Military Cross. Having taken the F.R.C.S. in 1920, he was seconded for five years to the Egyptian army and Sudan Defence Force. In the late war he served as A.D.M.S., 46th Division, and D.D.M.S., 5th Corps, in North Africa and Italy; he was promoted colonel in 1941 and major-general in 1944, and was appointed C.B. For the past two years he has been D.D.M.S., Southern Command, and an honorary physician to the King. His publications include a life of his father, and papers on the diseases of Mongalla, on the treatment of malaria, and on injuries of the knee-joint.

CORRIGENDUM.—In announcing the new fellows of the Royal Society last week we should have claimed Dr. W. A. H. Rushton as a medical fellow.

Diary of the Week

APRIL 4 TO 10

Sunday, 4th

LONDON JEWISH HOSPITAL MEDICAL SOCIETY, Stepney Green
3 P.M. Mr. Louis Golding: Workshop of a Novelist's Brain.

Monday, 5th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
6.15 P.M. Dr. Joan Millar: Anæsthesia for Thoracic Surgery.
WESTMINSTER HOSPITAL, Horseferry Road, S.W.1
5 P.M. (Meyerstein lecture theatre.) Clinicopathological demonstration on hypertension.

Tuesday, 6th

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Dr. Geoffrey Organe: Endotracheal Anæsthesia and Anæsthesia for Maxillofacial Surgery.

Wednesday, 7th

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Dr. J. K. Hasler: Pre-anæsthetic Treatment.
MEDICAL SOCIETY OF THE L.C.C. SERVICE
3 P.M. (St. Charles's Hospital, W.10.) Clinical meeting.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. Doris Odlum: Problems of Adolescent Behaviour.

Thursday, 8th

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Dr. H. H. Pinkerton: Anæsthesia for Urological Surgery.

Friday, 9th

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Dr. Stanley Rowbotham: Regional Analgesia.
BIOCHEMICAL SOCIETY
1.30 P.M. (University College, Dublin.) Short papers.

Appointments

BAYNES, T. L. S., M.D. Lond., F.R.C.S.: gynæcologist, Royal Waterloo Hospital, London.
BROWN, J. T., M.B. Glasg., D.P.H.: tuberculosis officer, Essex.
FRASER, J. F., M.B. Durh., D.OBST.R.C.O.G.: M.O.H. and divisional M.O., Pontefract, Yorks.
GANS, B. F., M.D. Lond., M.R.C.P.: physician, children's department, St. John's Hospital, Lewisham.
HORROCKS, J. E., M.B. Manc.: pathologist i.c. Birch Hill Hospital laboratory, Rochdale.
HUDSON, DOROTHY, M.B. St. And., D.P.H.: asst. county M.O., Essex, and asst. M.O.H., Walthamstow.
KANE, WINIFRED, M.R.C.S., D.P.H.: asst. M.O.H. for maternity and child welfare, Manchester.
PEARSON, MARION, M.B. Glasg., F.R.C.S.E.: senior resident orthopædic surgical officer, Pinderfields Emergency Hospital, Wakefield, Yorks.

Colonial Service:

CROSSWELL, H. D., M.D. Lond., M.R.C.P.: M.O., Jamaica.
HEISCH, R. B., M.B. Camb.: parasitologist, Kenya.
JEZIERSKI, TEODOR, M.D. Poznan: M.O., Fiji.
LEWIS, WINIFRED, M.B. Brist.: M.O., Uganda.
PHILIP, C. R., O.B.E., M.D. Aberd., D.T.M. & H.: deputy director of medical services (supernumerary), Kenya.
TODD, C. H., M.B. Belf.: M.O., Seychelles.

Births, Marriages, and Deaths

BIRTHS

BRADDON.—On March 15, in London, the wife of Dr. I. G. Braddon—a daughter.
KNOX.—On Feb. 23, at Durban, the wife of Mr. Lance Knox, F.R.C.S.—a son.
MONRO.—On March 21, in London, the wife of Mr. R. S. Monro, F.R.C.S.—a daughter.

MARRIAGES

PYKE—STEWART.—On March 19, in London, David Pyke, M.B., to Janet Stewart.

DEATHS

COODE.—On March 23, Claude Lionel Coode, M.A., B.M. Oxfd.
HOOPER.—On March 23, at Bells Barns, Kirkcudbright, Arthur Norman Hooper, M.A., M.B. Camb., F.R.C.S., aged 59.
MORTON.—On March 19, William Andrews Morton, B.A., M.D. Dubl.
MUIRHEAD.—On March 18, at Earley, Berks, Islay Burns Muirhead, M.A., M.D. Glasg., aged 94.
RATCLIFF-GAYLARD.—On March 22, at Hemel Hempstead, James Ratcliff-Gaylard, M.D. Brux., aged 86.
RENDEL.—On March 17, in London, Arthur Bowen Rendel, M.A., M.B. Camb., aged 85.
REYNELL.—On March 21, Walter Rupert Reynell, M.A., D.M. Oxfd, F.R.C.P.
ROWAN.—On March 17, at Monkton, Ayrshire, John Rowan, M.B., C.M. Glasg., F.R.F.P.S.

Dr. John Beattie, Bernhard Baron research professor at the Royal College of Surgeons, is making a month's tour of Army Medical Department installations in the U.S.A., during which he is expected to initiate at Cleveland, Ohio, a research programme on kidney function to be carried out jointly by the Cleveland Clinic and the Royal College of Surgeons.

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PENICILLIN AND SULPHATHIAZOLE IN TYPHOID FEVER*

CLINICAL TRIAL

GWEN BEVAN
B.Sc. Lond., M.R.C.S.
MEDICAL OFFICER, TANYBWLCH FEVER HOSPITAL, ABERYSTWYTH

MARJORIE V. N. SUDDS
M.B. Lond., D.T.M. & H.
DIRECTOR, PUBLIC HEALTH LABORATORY, ABERYSTWYTH

REES EVANS
M.D. Lond., D.P.H.
COUNTY MEDICAL OFFICER OF HEALTH, CARMARTHENSHIRE

M. T. PARKER
M.B. Camb., Dipl. Bact.
DIRECTOR, PUBLIC HEALTH LABORATORY, CARMARTHEN

IDWAL PUGH
M.B. Lpool, D.P.H.
DEPUTY MEDICAL OFFICER OF HEALTH, SWANSEA

A. F. S. SLADDEN
M.A., D.M. Oxfd
DIRECTOR, PATHOLOGICAL DEPARTMENT, BECK LABORATORY, SWANSEA GENERAL HOSPITAL

CONSIDERABLE interest was aroused when Bigger (1946) found that typhoid bacilli are killed, or effectively inhibited, in the test-tube by the combined action of penicillin and sulphathiazole. Bigger suggested that typhoid fever might be treated with a combination of the two drugs, and McSweeney (1946) followed this suggestion and claimed good results in a few cases treated in this way.

The typhoid outbreak that occurred in Aberystwyth in July–August, 1946, offered an opportunity, now fortunately rare in this country, for a trial of the combined penicillin-sulphathiazole treatment. On the suggestion of the Public Health Laboratory Service (directed by the Medical Research Council for the Ministry of Health) and with the coöperation of the Welsh Board of Health arrangements were made for a clinical trial.

A general account of the outbreak has been published by Evans (1947). The vehicle of infection was ice-cream infected by a urinary carrier, and the total number of cases was estimated at 202. Of these, 97 were reported from the borough of Aberystwyth and 30 from the adjoining rural districts, and 75 were scattered throughout the country as single cases or as small groups of cases in patients who had returned home from holiday at Aberystwyth. The infecting organism was a strain of Vi-phage type C, and most of the cases outside the Aberystwyth area were verified at the Central Enteric Reference Laboratory as belonging to the outbreak by typing the strains of typhoid bacilli by the Vi-phage technique (Craigie and Yen 1938, Craigie and Felix 1947).

Because of insufficient accommodation at the local hospital only 57 patients were treated in Aberystwyth and 82 cases were admitted to nine hospitals in South Wales. This unavoidable decentralisation made it rather difficult to devise a plan that could be uniformly followed regarding selection of cases for drug treatment and for controls, details of treatment, laboratory examinations, &c.

Another complicating factor was the great number of children among the patients, owing to the fact that the Aberystwyth ice-vendor used to sell his ice-cream regularly outside the elementary school (Evans 1947). Since typhoid usually takes a milder course in children, it was considered advisable to limit the clinical trials, so far as possible, to cases in adults.

The general impression was that the cases in this outbreak were, on the whole, not of a very severe type. According to information collected by the Welsh Board of Health and the Central Enteric Reference Laboratory there were only 5 deaths among the 139 Aberystwyth cases treated in ten hospitals in Wales. The exact number of deaths among the 63 cases infected in Aberystwyth and notified in various parts of the United Kingdom could not be ascertained. Thus the case-fatality rate in this outbreak was 3·6% as compared with 9·7% in the milk-borne outbreak of 1936 in Bournemouth, and 14% in the water-borne outbreak of 1937 in Croydon.

Of the fatal cases 2 occurred among 61 patients who had no drug treatment, 2 among 57 patients receiving penicillin and sulphathiazole, and 1 among 6 patients treated with penicillin alone. These figures do not suggest that the low case-fatality rate in the Aberystwyth outbreak can be attributed to the effect of treatment. The case-fatality rate among the untreated cases was only 3·3%; and, even if it is admitted that, on the whole, the cases receiving treatment were slightly more severe than those in the untreated series, it seems very improbable that in the complete absence of specific treatment the case-fatality rate in this outbreak would have approached that at Bournemouth or Croydon.

Since the object of the trial was to find out whether the favourable results claimed by McSweeney (1946) could be confirmed on a greater number of cases, it was decided to follow as closely as possible the procedure McSweeney had adopted. This was to give two courses, each comprising about 10,000,000 units of penicillin and 34 g. of sulphathiazole, each course lasting four days. When the arrangements for the trial were made, three of the hospitals had enough suitable cases to permit of selecting a group of patients for the drug treatment and a comparable group for controls. It was, however, impossible to adhere in all details to a uniform procedure, and this makes it necessary to describe separately the clinical and laboratory observations made in each of the three hospitals.

AT TANYBWLCH FEVER HOSPITAL, ABERYSTWYTH

Gwen Bevan and Marjorie V. N. Sudds

A total of 57 patients from the Aberystwyth outbreak were treated at the local hospital. Nearly all were admitted in a week, filling the hospital to capacity, and for some time facilities for carrying out controlled treatment were inadequate. A few of the patients were very ill. Many had relapses after their temperatures had subsided a few days. The relapses often were more severe than the original fever. One patient died of intestinal hæmorrhage and another of myocardial failure before treatment with the two drugs was begun.

By the time adequate supplies of penicillin became available most of the more severely ill patients were in the third or fourth week of the disease. Table I shows that 4 patients received their first course of penicillin-sulphathiazole in the second week, 9 in the third week, and 7 in the fourth week; 1 patient (case 7) was given the treatment during a severe relapse. Admittedly conditions were not ideal for a scientifically planned trial, but Bigger (1946) and McSweeney (1946) had aroused hopes that the patients might benefit from the drug treatment, and we aimed at selecting the most severe cases that were considered to be in need of a special therapy.

The assessment of the severity of the cases was made easier by the fact that the treatment was begun during the later stages of the illness with the symptoms of the disease fully developed. The cases were classified according to their severity immediately before the start of treatment, the sole criterion being the clinical condition. Blood-culture and estimation of the O-antibody titre, recommended by Felix (1924) as additional criteria of the severity of the disease, could not be carried out in many of the cases at the height of the outbreak.

* A report to the Medical Research Council.

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Table I summarises the results of the combined penicillin-sulphathiazole treatment. Before the beginning of the treatment each case was classed separately under the headings "severity of toxæmia" and "severity of pyrexia," and from these two criteria the "total severity" was derived. For the sake of simplicity this "total severity" alone is indicated in table I. After the treatment the "effect on toxæmia" and "effect on pyrexia" were assessed separately and are recorded in table I separately. Of the 25 cases listed in the table only 6 were in children under the age of 14.

Cases Treated with a Single Course of Penicillin-sulphathiazole

Cases 1–10 received only one course of the combined drugs. This group included 2 mild cases, 1 relapse, 4 moderately severe, 2 severe cases, and 1 case classed as very severe. There was no appreciable effect on the pyrexia in any of these patients. Cases 5, 6, and 9 showed some clinical improvement during or after their course of treatment, which was completed on the 17th, 31st, and 22nd day respectively. It is, however, difficult to assert that the improvement was due to the drugs.

Case 10, a girl aged 4½ years, illustrates the difficulties in assessing the effects of the treatment in the individual case. This little girl was the youngest patient in the series and the one to receive the drug treatment at the earliest stage in the disease (6th day). Her clinical state seemed to be "very severe," and the considerable improvement in toxic symptoms following the 4-day course was labelled as "dramatic," in spite of the fact that the temperature curve remained unaffected. The laboratory findings did not tally with the clinical assessment of the severity of this case. Blood-culture had not been done before the administration of the drugs was begun, but a specimen of serum taken on the 6th day of illness showed an O-agglutinin titre of 1 in 500, indicating that the prognosis was good (Felix 1924). Typhoid bacilli were never isolated from the girl's blood or fæces.

Cases Treated with Two Courses of Penicillin-sulphathiazole

This group consisted of 11 cases (cases 11–21). None of the patients showed any definite improvement as a result of the first 4-day course. Cases 11 and 20, both women aged 24, were treated in the third week of the disease and seemed to show some transient improvement with their first course. However, the second course, which followed after an interval of only three days, did not produce any response whatsoever in either of the 2 patients.

Cases 17, 18, and 19 merit special comment because they were treated with double the usual dosage of penicillin—i.e., 400,000 units every two hours.

Case 17, a boy aged 16, showed no improvement at all after the first course of 10,000,000 units (19th–23rd days). He developed a relapse, and a course of 20,000,000 units proved ineffective (40th–44th days). A further course of 20,000,000 units was given on the 48th–52nd days of illness, and the boy eventually recovered after having received 50,000,000 units of penicillin and 99 g. of sulphathiazole.

Case 18, a woman aged 30, classed as having moderately severe typhoid, did not respond to the first course of 10,000,000 units, and her blood-culture was positive after the completion of the course (26th–30th days). A course of 20,000,000 units was given on the 43rd–47th days, and this was followed by recovery.

Case 19, a woman aged 44, appeared to have improved after her first course (9th–11th days). However, she had an attack of cholecystitis, and a course of 20,000,000 units of penicillin (51st–55th days) had no effect. The patient excreted typhoid bacilli in her fæces for nearly six months.

Cases Treated with Anti-typhoid Serum

When the failure of the combined penicillin-sulphathiazole treatment became evident, recourse was had to specific serum therapy. To 5 patients whose condition caused grave anxiety was given Felix's anti-typhoid (Vi + O) serum, prepared at the Lister Institute (Hodgson 1944). Cases 20 and 21 were first treated with penicillin and sulphathiazole, but the condition of both patients deteriorated during treatment. Case 22 received first a course of sulphathiazole and subsequently serum, whereas cases 24 and 25 were given anti-typhoid serum alone. Of the 5 serum-treated patients 4 promptly showed definite improvement, whereas case 22 showed no appreciable effect of the serum treatment; but this patient, too, recovered. Thus there was no fatal case in the 25 cases treated with penicillin, sulphathiazole, and anti-typhoid serum.

Controlled Group of Treated Cases

As already mentioned, it was impossible at the height of the outbreak to carry out a controlled trial of the drug treatment. As soon as conditions at the hospital returned to normal, an attempt was made to observe the effects of the combined penicillin-sulphathiazole treatment more accurately by selecting a small group of cases for the drug treatment and a comparable group for controls. Since there were no fresh admissions, only cases in the third and fourth week of the disease were available, and from these 16 suitable cases were chosen for the trial and divided into two groups. The corresponding cases in each of the two groups of 8 patients tallied fairly closely with regard to age, day of illness, and severity of disease. No patient under 15 or above 40 years of age was included in the two groups.

Each patient in the treated group received a course of 10,000,000 units of penicillin and 33 g. of sulphathiazole given in 4 days, as recommended by McSweeney (1946). No significant difference could be detected between the 8 cases that received the drug treatment and the corresponding 8 control cases. The 8 treated cases that were controlled in this way are included in table I and are marked with an asterisk. The table shows that 3 of these patients (cases 12, 17, and 18) were given further courses of penicillin-sulphathiazole treatment. The 8 control patients that had no drug treatment are not tabulated.

Blood-culture

Table I shows that it has not been possible in this series of cases to examine specimens of blood in a systematic manner before and after the drug treatment. Nevertheless 4 patients (cases 15, 16, 18, and 21) yielded a positive blood-culture after the completion of a full course of penicillin-sulphathiazole.

Fæcal Excretion

The dates of the last positive specimen of fæces recorded in the 16 cases in the controlled series were as follows:

Treated group (8 cases): 21st, 26th, 41st, 48th, 59th, 60th day, and in 2 cases the specimens were negative throughout convalescence.

Untreated group (8 cases): 24th, 27th, 37th, 47th, 49th day, and in 3 cases the specimens were negative throughout convalescence.

The average dates of the last positive stool for the group of patients treated with penicillin and sulphathiazole and for the group of cases that were not given any special treatment were as follows:

Treated group (20 cases): 28 days since onset (6 days since last day of fever).

Untreated group (31 cases): 25 days since onset (7 days since last day of fever).

Of the patients treated with penicillin and sulphathiazole, 2 remained persistent excretors (cases 19 and 24) and so did 2 cases in the untreated group. These cases were not included in the calculation of the average dates.

Thus, fæcal excretion of the typhoid bacillus was not shorter in the treated cases than in the controls. But, had it been possible to examine in each case more specimens early in convalescence, the average periods of

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fæcal excretion in the two groups would almost certainly have been found to be considerably longer, because in calculating the average some cases were included that had already become negative when examinations were first started. At Carmarthen, for example, where it was possible, in view of the small number of cases, to institute bacteriological examinations early in convalescence, the average duration of excretion appeared to be longer (see below).

AT TUMBLE ISOLATION HOSPITAL, CARMARTHEN

Rees Evans and M. T. Parker

Of the first 20 patients admitted the occupants of alternate beds were selected for treatment. This group was compared with the remaining patients who were intended to be used as controls, and found to be roughly equal in age and sex distribution. At first sight there appeared to be about equal numbers of severely ill patients in the two groups. Patients admitted later were allotted alternately to the two groups. Two patients in the control group had subsequently to be removed, one because the diagnosis of typhoid fever had not been established finally, and the other because it was due to a strain of *Salm. typhi* not belonging to Vi-phage type C and therefore was unrelated to the Aberystwyth outbreak. Thus there are 12 cases in the treated group and 10 in the control group.

Unfortunately the subsequent history of the cases showed that rather more severely ill persons had been included in the treated group than in the control group. This was unavoidable, since it was considered essential to start treatment at the earliest opportunity, to secure the maximal effect.

Method of Treatment

Seventeen courses of treatment were administered to the 12 patients. In every case the first course was begun within 3 days of admission; 3 patients who showed no sign of remission were given a further course 6–10 days after the end of the first. Two additional courses were given during relapses.

TABLE I—RESULTS OF TREATMENT OF 25 TYPHOID CASES AT TANYBWLCH FEVER HOSPITAL

Case no.	Sex and age (years)	Clinical course	Duration of pyrexia (days)	Treatment			Effect on—		Blood-culture	
				Day of illness	Penicillin (mega units)	Sulphathiazole (g.)	Toxæmia	Pyrexia	Before treatment	After treatment
* 1	M15	Mild	19	33–37	10·0	33	Nil	..	–	N.S.
* 2	F16	Mild	11	21–25	10·0	33	Nil	..	–	N.S.
3	M12	Mod. severe	31	18–21	7·6	28	Nil	Nil	N.S.	–
4	F13	Mod. severe	35	15–18	7·2	27	Nil	Nil	N.S.	–
5	F50	Mod. severe	50	14–17	7·2	27	Improved	Nil	N.S.	–
* 6	F38	Mod. severe	32	27–31	10·0	33	Improved	Nil	+	–
7	F36	Relapse (severe)	36	30–34	10·0	33	Nil	Nil	+	–
* 8	F15	Severe	31	21–25	10·0	33	Nil	Nil	–	–
* 9	M17	Severe	26	18–22	10·0	33	Improved	Nil	+	–
10	F4½	Very severe	17	6–10	2·4	24	Vastly improved	Nil	N.S.	–
11	F24	Mod. severe	40	15–18 21–25	7·2 10·0	27 33	Improved Nil	Slight Nil	N.S. N.S.	– N.S.
*12	F35	Mod. severe	43	26–30 39–43	10·0 10·0	33 33	Nil Improved	Nil Improved	+ N.S.	– –
13	F23	Mod. severe	42	24–28 37–41	10·0 10·0	33 9	Nil Improved	Nil Nil	– N.S.	– –
14	F14	Severe	40	17–20 23–27	7·2 10·0	27 33	Nil Nil	Nil Nil	N.S. –	N.S. –
15	F10	Very severe	29	12–15 18–22	7·2 10·0	27 33	Nil Slight	Slight Slight	N.S. N.S.	+ –
16	M14	Very severe	78	17–20 26–32	7·2 14·4	27 27	Nil Nil	Nil Nil	N.S. +	+ –
*17	M16	Very severe with relapse	27 + 16	19–23 40–44 48–52	10·0 20·0 20·0	33 33 33	Nil Nil Improved	Nil Nil Improved	– – –	– – –
*18	F30	Mod. severe with relapse	30 + 12	26–30 43–47	10·0 20·0	33 33	Nil Improved	Nil Improved	– –	+ –
19	F44	Severe, with attack of cholecystitis	27 + 3	9–11 51–55	7·2 20·0	27 30	Improved Nil	Slight Nil	– N.S.	– N.S.
20	F24	Very severe	60	17–22 25–35 36–38	8·1 24·0 100 ml. anti-typh. serum	45 27	Improved Nil Definite	Nil Nil Definite	N.S. – N.S.	N.S. – N.S.
21	F21	Very severe	48	9–12 16–20 16–18	7·2 10·0 100 ml. anti-typh. serum	27 33	Slight Much improved	Nil Much improved	N.S. N.S.	– +
22	F9	Very severe	66	24–29 35–37	None 46 ml. anti-typh. serum	30	Nil Nil	Nil Nil	N.S. N.S.	N.S. N.S.
23	M11	Very severe	..	21–26	None	30	Nil	Nil	N.S.	–
24	F28	Severe	33	23–25	100 ml. anti-typh. serum		Improved	Improved	–	–
25	F57	Very severe with relapse	72	34–36	100 ml. anti-typh. serum		Improved	Improved	–	–

N.S. = No specimen of blood examined. "Duration of pyrexia" column: 27 + 16 means 27 days in primary attack and 16 in relapse.
* These 8 cases were controlled by 8 corresponding cases that had no drug treatment.

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The standard course consisted of 9,600,000 units of penicillin in two-hourly doses, and 32 g. of sulphathiazole in three-hourly doses during 96 hours. For children under 8 years of age the dosage of sulphathiazole was halved. Sixteen of the seventeen courses were completed. In one case the patient died after receiving 3½ days' treatment. (In addition, a partial course, which is not included in the above total, was given to a patient after intestinal perforation.)

Results

General.—The cases treated were too few for the effects to be fully assessed. It was easy to see that the treatment had no dramatic effect, but it was very difficult to be sure that it was useless.

The cases seen by us were very variable in severity. There appeared to be an unduly high proportion of mild cases, and it was not always possible to say at first sight which of the cases were destined to pursue a mild course. Several of the mild cases in the untreated group were of short duration, and this makes it necessary to be very cautious in asserting that the treatment cut short the febrile period in those cases where remission rapidly followed the administration of penicillin and sulphathiazole.

Severe Cases.—Two severe cases continued to worsen during treatment. In one of them the patient died, presumably from toxæmia and bronchopneumonia, on the 4th day of treatment (18th day of disease). In the other intestinal perforation took place on the 8th day after the institution of treatment (31st day of disease) and caused death from general peritonitis.

Two severe cases received their first course of treatment in the second week of disease without any clinical improvement being apparent. In one of them, intestinal hæmorrhage occurred during the treatment. In both cases a second course of treatment was given later in the first bout of fever, without any evidence of clinical improvement, though lysis began soon after the end of the course (26th and 27th day of disease respectively). One of them relapsed on the 41st day, and a third course of treatment was without apparent effect.

Two severe cases showed some clinical improvement during the first course of chemotherapy. It is noteworthy that these were the only children among the severe cases.

In one of these two children the apparent clinical improvement was not very pronounced. There was, however, a definite reduction of temperature coincident with the treatment. On admission there was continuous fever around 103°F which fell to 101°F on the second day of treatment (6th day of disease) and thereafter was irregularly remittent between 99° and 101·6°F. However, a second course of chemotherapy had no further effect on the fever, which persisted until the 28th day of disease.

In the other child there was much clinical improvement on the second day of treatment. The patient had been severely ill, drowsy, and pallid, with a rapid irregular pulse on admission. The temperature fell critically on the second day of treatment (12th day of disease) and thereafter was irregularly intermittent for a further 7 days, while the clinical condition improved steadily. However, during a relapse beginning on the 33rd day of disease, a further course of treatment had no apparent effect on the fever or the toxæmia.

Moderate and Mild Cases.—In some of the less severe cases it is even more difficult to assess the effects of treatment. In 4 of these, subsequent inspection of the temperature charts suggested that lysis had already begun before the institution of treatment, but the irregularity of the fever makes it difficult to be sure. Short mild cases were common in both the treated and the untreated groups, but clinical mildness was not always associated with a short fever. Thus, though the treatment probably had no effect in shortening the course, in some cases it is impossible to be sure.

TABLE II—RESULTS OF FÆCAL CULTURES IMMEDIATELY BEFORE, DURING, AND AFTER TREATMENT

Case no.	Days of disease when treatment was given	Result of fæces culture			
		0–4 days before course	During course	0–4 days after course	6–10 days after course
1	16–20	−	+	−	+
2	6–10	+	+	+	+
3	6–10	+	+	N.S.	+
4	19–23	+	+	+	+
5	24–28	+	N.S.	+	+
6	8–12	−	+	+	+
7	15–18	+	+	N.S.	N.S.
8	7–11	N.S.	+	N.S.	+
	21–25	+	+	+	−
9	23–27	−	+	+	N.S.
10	12–16	+	+	+	+
	22–26	+	+	−	−
	46–50	−	+	+	+
11	5–9	−	+	−	+
	19–23	+	+	+	−
12	11–15	−	−	+	+
	36–40	+	−	+	+

N.S. = No specimen examined.

In 1 case of moderate severity there was no evidence that improvement followed the course of treatment given at the end of the third week; and a mild ambulant case continued to have irregular intermittent fever for a fortnight after the end of treatment.

Complications and Relapses

None of the usual complications developed among the untreated cases. One of the least severe had an attack of delusional insanity during convalescence. Among the treated cases there was one instance each of intestinal hæmorrhage and of perforation. Both developed after the beginning of treatment. There were two relapses in the treated group and none in the control group. There is thus no evidence in this series of cases that the treatment reduced the incidence of complications or relapse.

Blood-culture

Blood-cultures were positive in 8 of the 12 cases just before treatment. A repetition of the test 36 hours after the cessation of treatment showed that only 2 out of 12 were still positive. The first conclusion that can be drawn from this is that treatment does not lead to a permanent sterilisation of the blood. It is less easy to decide whether the treatment had any effect on the bacteræmia.

Of the 6 patients in whom the blood-culture became negative after treatment 2 were already afebrile by this time (on the 12th and 14th day of disease) and 2 were in the fourth week of disease. The remaining 2, however, negative on the 11th and 17th day of disease, continued pyrexial for over a fortnight after treatment, and thus might have been expected to have had a positive blood-culture at this stage.

Some attempt at a quantitative blood-culture technique was made, and it was noted that in the 2 severe cases in which the culture was still positive 36 hours after the cessation of the first course of treatment the number of organisms was apparently less than before treatment.

In the 3 cases in which a second course of treatment was given in the later stages of the first bout of fever the blood-culture was negative both before and after. In the 2 relapses the culture was positive before and negative after treatment. It is possible, on these findings, that the treatment may have led to some reduction of the degree of bacteræmia.

Fæcal Excretion

With the criterion of six negative specimens as an indication of the cessation of excretion, and with the

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exclusion of the 2 fatal cases in the treated group, the average dates of the last positive stool were:

Treated group (10 cases): 52·4 days since onset (23·9 days since last day of fever).

Untreated group (10 cases): 37·5 days since onset (16·8 days since last day of fever).

In 1 case in the treated group, which was retained in hospital after six negative specimens had been obtained, excretion began again after an interval of 31 days, and eleven further positive stools were obtained between the 92nd and 142nd days of disease. This second period of excretion has not been included in the calculation of the average figure for the group.

There is thus no evidence that the treatment reduced the period of fæcal excretion of the typhoid bacillus.

Even if the treatment had no lasting effect on the excretion of organisms in the fæces, it might have been expected to cause their temporary disappearance. The result of cultures performed before, during, and after the seventeen courses of treatment are shown in table II. There was no evidence of temporary cessation of excretion. This finding came as something of a surprise in view of the well-known fact that the administration of each of the two drugs to temporary excretors during convalescence, or to chronic carriers, almost invariably leads to transient cessation in the excretion of typhoid bacilli. The inability of the drug treatment to produce a similar effect during the actual attack of typhoid fever is therefore of special interest.

The method of culture used was direct plating of the specimen on to Wilson and Blair's medium (Tabet's modification), together with primary enrichment in Kauffmann's tetrathionate broth followed by plating on Wilson and Blair's medium.

Positive urinary cultures were few and rather sporadic, and no chronic urinary carriers developed among the treated or the untreated cases.

AT SKETTY ISOLATION HOSPITAL, SWANSEA

Idwal Pugh and A. F. S. Sladden

Of 19 patients from the Aberystwyth outbreak transferred to the Swansea County Borough Isolation Hospital for treatment 14 of suitable age were selected for the trial: 6 were given the penicillin-sulphathiazole treatment, and 8, so far as possible of comparable age, formed the control group. No patient under the age of 14 was given the drug treatment.

In general the cases in the treated group seemed to be more acutely ill than their controls. In the treated group the severity of illness was assessed as moderate in 3 cases, severe in 2 cases, and very severe in 1 case. In the control group there were 4 mild cases, 3 of moderate severity, and 1 very severe case.

The standard course was penicillin 200,000 units every two hours for 4 days, together with sulphathiazole 1 g. every three hours. In 5 of the treated cases the same course was repeated after an interval of 48 hours, bringing the total dosage to about 20,000,000 units of penicillin and 32 g. of sulphathiazole. In the sixth case the dosage of penicillin was doubled during the second course.

Results

In 3 moderately severe cases—a boy aged 16, a woman aged 50, and a woman aged 57—there was no appreciable benefit from the drug treatment; in these cases the treatment was begun on the 9th, 12th, and 16th day of illness respectively.

A boy aged 14, classed on clinical grounds as severe, received the first course on the 15th day of illness. There was immediate reduction of temperature but no apparent effect on the toxæmia. The blood-culture had been negative on the 14th day—i.e., before the treatment began—and O-agglutination to a titre of 1:125 had been obtained on a specimen of serum taken as early as the 4th day of illness. According to Felix (1924) these two findings indicate that the patient was less severely ill than the clinical assessment suggested.

A woman aged 23, classed as a severe case, was given the first course on the 11th day of illness. There was no evidence of any effect on pyrexia or toxæmia, and typhoid bacilli were isolated from the blood 24 hours after the completion of the first course of treatment (15th day). The second course was followed by fall in temperature and well-marked clinical improvement, but three weeks later the patient had a severe relapse, from which she eventually recovered.

The sixth case, in a woman aged 22, classed as very severe, received the first course on the 13th day of illness and showed no appreciable response. Blood-culture was positive on the 11th day (before treatment) and negative on the 18th day (two days after completion of the first course). A double dose of penicillin was given in the second course during the 19th–22nd days (400,000 units of penicillin every two hours), and this coincided with rapid improvement. This case therefore received about 30,000,000 units of penicillin and 64 g. of sulphathiazole.

All the patients in the two groups recovered in due course. Most of them had troublesome sickness after administration of sulphathiazole. One of the patients with a mild attack in the control group continued to excrete typhoid bacilli for over eight months and had her gall-bladder removed. The dates of the last positive stool for the remaining cases in the two groups were:

Treated group (6 cases): 15th, 52nd, 63rd day, and in 3 cases the specimens were negative throughout convalescence.

Untreated group (7 cases): 36th, 44th, 47th day, and in 4 cases specimens were negative throughout convalescence.

The small number of cases treated does not allow any firm conclusion to be drawn. It is, however, justifiable to state that the dosage of penicillin and sulphathiazole used by McSweeney (1946) was inadequate for the treatment of the more severe type of case. There was no opportunity of adequately investigating the possible effect of doubling the dosage of penicillin or increasing it even further.

Sensitivity of Aberystwyth Typhoid Strain to Penicillin and Sulphathiazole

M. T. PARKER

It was thought that the disappointing results of the clinical trials might be due to an unusually high degree of insensitivity of the Aberystwyth strain to the combined action of penicillin and sulphathiazole. Cultures isolated from the blood of 2 patients and from the fæces of a third during convalescence from the Aberystwyth outbreak were therefore compared in in-vitro tests with four typhoid strains belonging to different Vi-phage types (one strain each of Types A and E1, and two strains of Type N—formerly Type Richmond). The data from the test-tube experiments will be published elsewhere. Briefly, the three Aberystwyth strains showed a slightly greater sensitivity to penicillin alone than did the four strains of different Vi-phage types. The effects of sulphathiazole alone and of penicillin-sulphathiazole mixtures on the Aberystwyth strains were apparently very little different from their effects on the other four strains.

The failure of the combined penicillin-sulphathiazole treatment cannot therefore be attributed to a particularly high degree of insensitivity of the Aberystwyth strain to the action of the two drugs.

Summary and Conclusions

Our experiences of the combined penicillin-sulphathiazole treatment during the Aberystwyth outbreak have been disappointing.

Of 39 patients who received courses of treatment similar to those adopted by McSweeney (1946) most

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were treated in the second and third weeks, as were also McSweeney's patients. We did not observe the speedy disappearance of toxæmia and subsidence of pyrexia described by McSweeney.

Three small groups of patients treated with penicillin-sulphathiazole were compared with three untreated control groups, and there was no evidence of an appreciable clinical effect of the drug treatment.

There were no fatalities in our largest group of 25 treated cases (table I), but 5 of the patients whose condition caused the greatest anxiety had been given Felix's "Vi + O" anti-typhoid serum.

A considerable proportion of patients yielded positive blood-cultures shortly after completion of their courses of penicillin-sulphathiazole treatment.

Fæcal excretion of typhoid bacilli during convalescence was not shorter in the treated groups than in the controls.

In one of the treated groups that was suitably examined for the purpose (table II) there was no evidence of even a temporary disappearance of typhoid bacilli from the fæces.

The typhoid strain responsible for the Aberystwyth outbreak was not more resistant to the action of penicillin and sulphathiazole than were four other strains with which it was compared in in-vitro tests.

We consider it necessary to warn against the indiscriminate use of penicillin-sulphathiazole in the treatment of typhoid fever.

REFERENCES

Bigger, J. W. (1946) *Lancet*, i, 81.
Craigie, J., Felix, A. (1947) *Ibid*, i, 823.
— Yen, C. H. (1938) *Canad. publ. Hlth J.* **29**, 448, 484.
Evans, D. I. (1947) *Med. Offr*, **77**, 39.
Felix, A. (1924) *J. Immunol.* **9**, 115.
Hodgson, A. E. (1944) *Brit. med. J.* ii, 339.
McSweeney, C. J. (1946) *Lancet*, ii, 114.

WEIGHT CHANGES IN PREGNANCY

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THIS paper records the maternal weight changes during pregnancy observed by assistant medical officers, health visitors, and clerks under the administrative direction of one of us (J. A. S.) and analysed statistically by the other (B. B.).

INVESTIGATION

The primary object of the investigation was to determine, in so far as regular weight observations throw light on the subject, whether the war-time dietary, including the extra rations available to pregnant women, sufficed to maintain good health. No women refused to coöperate, and the tables and charts therefore include all women attending the centres who fulfilled the prescribed conditions—namely, attendance for weighing as nearly as possible to the weeks of pregnancy at which it was decided to record the weights, with an outside limit of a week from these periods. The charts and tables contain evidence that the war-time dietary was, by this criterion, adequate, and bear out the conclusions based on other forms of investigation to evaluate the same facts.

TABLE III—MOTHERS WHO DID NOT GAIN WEIGHT

Between weeks of pregnancy	No. of mothers	No. who did not gain weight
16–20	360	10 (2·8%)
20–24	644	10 (1·6%)
24–28	875	35 (4·0%)
28–32	1170	64 (5·5%)
32–36	1221	74 (6·1%)
36–40	1014	150 (14·8%)

The number of published systematic observations of weight changes in pregnancy, however, is not extensive, and the findings in this series may therefore be worth reporting for their own sake. For practical purposes they appear to be applicable to peace-time conditions.

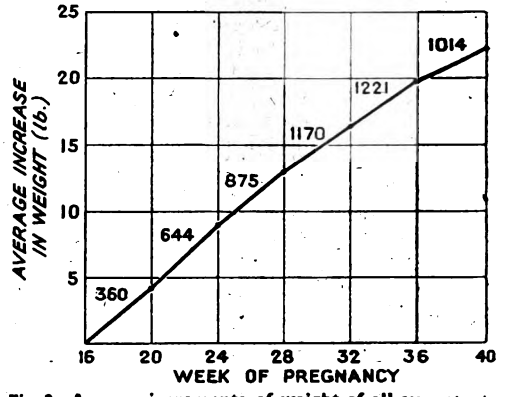

Fig. 2—Average increments of weight of all expectant mothers. Number of mothers weighed in each period is shown on curve.

The routine monthly weighing of all expectant mothers, stripped except for a dressing-gown of known weight, was begun in Fulham antenatal clinics in September, 1941. The records were summarised up to the beginning of 1944, and certain preliminary figures supplied to the Ministry of Health. Other preoccupations of common concern necessitated the deferment of the detailed analysis until now.

At the start of the observation it was felt necessary to exclude those who did not attend the clinic regularly or did not commence attendance until later than the 16th week of pregnancy. Four-weekly measurements (16th, 20th, 24th week, &c.) to term were made, and no greater deviation than a week either way from the standard times was allowed. Where this condition could not be fulfilled, the records have been excluded from this analysis. It should, however, be pointed out

TABLE I—INCREMENTS ACCORDING TO INITIAL WEIGHT—CONTINUOUS RECORDS FROM 16TH WEEK ONLY

Initial weight (st.)	No. of mothers	Mean initial weight (lb.)	Mean increment (lb.) between stated weeks of pregnancy					
			16–20	20–24	24–28	28–32	32–36	36–40
Under 8	54	106·48	3·81 ±0·40	4·19 ±0·25	3·25 ±0·26	2·73 ±0·25	3·12 ±0·26	2·09 ±0·35
8–	142	118·99	4·27 ±0·16	4·79 ±0·19	3·82 ±0·23	3·68 ±0·20	2·58 ±0·21	2·69 ±0·28
9–	91	132·12	4·38 ±0·28	4·59 ±0·27	3·90 ±0·28	3·18 ±0·22	2·74 ±0·30	2·40 ±0·34
10–	53	145·29	4·39 ±0·39	4·65 ±0·39	3·96 ±0·33	3·36 ±0·38	2·97 ±0·36	2·15 ±0·51
11–	14	158·44	4·14 ±0·58	4·34 ±0·48	2·34 ±0·58	3·67 ±0·76	3·12 ±0·89	2·23 ±1·42
Over 12	6	182·04	3·96 ±1·47	3·46 ±1·60	4·63 ±1·22	2·92 ±0·45	3·54 ±1·19	2·13 ±2·17
Total ..	360	126·89	4·24 ±0·14	4·59 ±0·14	3·73 ±0·15	3·35 ±0·13	3·19 ±0·15	2·43 ±0·18

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TABLE II—WEIGHT CHANGES IN PREGNANCY—ALL RECORDS (CONTINUOUS ONLY)

First attendance at end of week (approx.)	No. of mothers	Mean increment (lb.) between stated weeks of pregnancy					
		16–20	20–24	24–28	28–32	32–36	36–40
16	360	4·24 ±0·14	4·59 ±0·14	3·73 ±0·15	3·35 ±0·13	3·19 ±0·15	2·43 ±0·18
20	284	—	4·84 ±0·16	4·13 ±0·16	3·33 ±0·15	3·50 ±0·16	2·38 ±0·22
24	233	—	—	4·20 ±0·18	3·27 ±0·17	3·28 ±0·18	2·67 ±0·24
28	304	—	—	—	3·57 ±0·14	3·63 ±0·16	2·56 ±0·21
32	77	—	—	—	—	3·20 ±0·31	2·99 ±0·45
36	26	—	—	—	—	—	3·75 ±0·63
Total ..	1284	4·24 ±0·14	4·70 ±0·11	3·99 ±0·09	3·39 ±0·07	3·38 ±0·08	2·55 ±0·10

that the estimate of the start of pregnancy was that made by the antenatal medical officer in the light of clinical findings and of history, and that there is therefore some possibility of error. A total of 360 expectant mothers were observed from the 16th week of pregnancy until confinement.

RESULTS

The distribution of the initial weights of these mothers was as follows:

Stones	6–	7–	8–	9–	10–	11–	12–	13–	—
No.	3	51	142	91	53	14	3	3	Total 360

The mothers were first grouped according to initial weight, and growth increments were tabulated separately for each group. These figures are shown in table I. The margins shown are the standard deviations of the mean increments as estimated from the distributions of the individual increments. The cumulative increments are recorded graphically in fig. 1. It is clear from table I, without further analysis, that initial weight has little bearing on the rate of the weight increase.

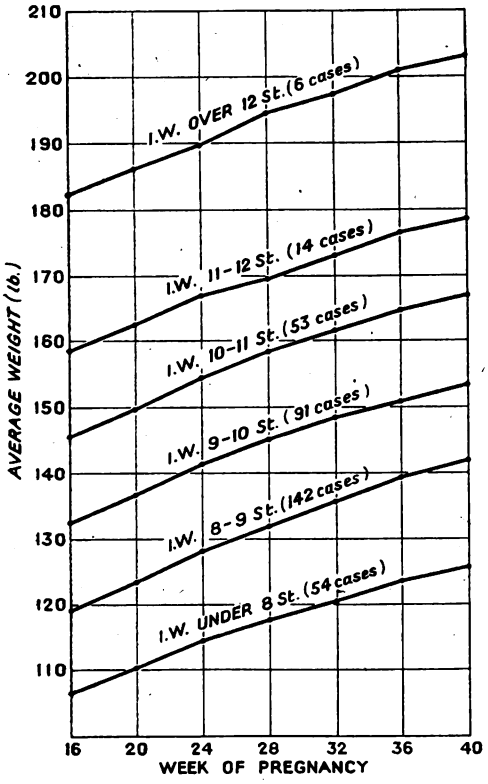

Fig. 1—Average increments of weight of 360 expectant mothers weighed from 16th week of pregnancy and classed according to initial weight (I.W.), showing that initial weight has little bearing on rate of increase.

It was next decided to include the records of all expectant mothers, however late they began to attend the clinics, provided the records were unbroken from the first attendance up to confinement or admission to hospital. The results (table II) are very close to those of the more strictly homogeneous data of table I. The mean cumulative increments for all women (combined data) are shown graphically in fig. 2.

Toward the end of the gestation period the percentage of expectant mothers not gaining weight increases (table III). In consequence the mean increment falls while the range (indicated by the standard deviation) remains fairly constant.

We are grateful for the careful work and great interest of the team who undertook this work, particularly Dr. M. Watson and Miss M. Cole on whom the major burden fell; and to Mr. S. V. Maudsley for the diagrams.

MEASURED RADICAL GASTRECTOMY *

REVIEW OF 505 OPERATIONS FOR PEPTIC ULCER

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(*Concluded from p. 510*)

GENERAL RESULTS

Only 433 of the original 500 patients were available for follow-up in December, 1947. The remainder are accounted for as follows:

Total number of patients	..	500
Operative deaths	25	
Late deaths	2	
Intercurrent deaths	12	
Lost sight of	3	
Less than six months since operation	25	
	—	67
Available for follow-up	..	433

DETAILED RESULTS

It is important to report results for G.U. and for D.U. separately; for, if the series contains a high proportion of G.U., the collective results will give too favourable an impression, since G.U. provide so few failures—1·9% against 5·1% for D.U. (tables IV and V).

Published results of less extensive operations for secondary ulcer following gastro-enterostomy, such as excision of the ulcer, undoing the anastomosis, &c., are disappointing. Resection of the most extensive type is without doubt the only justifiable method of treatment, and this must be done at the earliest possible moment, because these ulcers tend to penetrate deeply and acute perforation is not uncommon. If medical treatment does not give immediate relief, or if pain recurs after a course of medical treatment, operation should not be delayed.

The tables are based on a postoperative period which varies from six months to twelve years, and more detailed reports of the year-by-year late results are required before we can accept the six months to twelve years' survey as a reasonably accurate estimate of the results to be expected from this type of gastrectomy.

* Based on a lecture delivered to the York Medical Society, the Halifax and Derby branches of the B.M.A., and the Leeds Medico-Chirurgical Society.

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TABLE IV—THE 6 MONTH TO 12 YEAR RESULTS. DETAILED GRADING OF 433 PATIENTS OPERATED ON IN 1936–47 WHO WERE AVAILABLE FOR FOLLOW-UP IN DECEMBER, 1947

Grade	D.U.	G.U.	G.D.U.	S.U.	Total		
I ..	196	29	24	20	269 (62·1%)	(78·7%)	(95·1%)
II ..	50	13	6	3	72 (16·6%)		
IIIs ..	51	10	5	5	71 (16·4%)	(16·4%)	
IIIu ..	8	1	0	3	12 (2·8%)	(4·9%)	
IV ..	8	0	1	0	9 (2·1%)		
Total	313	53	36	31	433		

They correspond with the usual questionary call-up results in which many cases are inevitably lost sight of; but since we have kept in constant contact with patients, we have lost sight of only 3.

DISADVANTAGES OF SIX MONTHS TO TWELVE YEARS' SURVEY

This method of presenting results is not convincing, for three reasons:

(1) It fails to explain the proportion of recent cases included in the survey.

(2) It can give no indication of improvement or deterioration of results according to the time which has elapsed since operation, and it will only be accurate if very little change in grading has occurred since operation.

(3) It only reports the proportion of patients who were failures at the time of their last examination in 1947, and gives no indication of the number of patients who may have been failures at any earlier period and who have responded to treatment.

Some of these points can be explained by reporting all results at six-monthly intervals (tables VI and VII).

Table VI makes it clear that only 73 patients have been operated on more than 42 months. Though it is perfectly correct to say that this series has been "successfully followed up from six months to twelve years," the statement is misleading; for only a very small proportion have been followed up more than three years. This report therefore refers to early results, and we must wait until all the patients have passed their tenth year for the late results.

When a series of results of gastric surgery is published, both the "six months to twelve years" and the continuous six-monthly assessments should be reported. Nothing is gained by including an odd case or two, done many years ago, to make an impressive claim of cases followed up over a number of years. It is the number of cases followed up as well as the number of years they are followed up that matters, and these points should be made perfectly clear.

Such change as has occurred within the period of these observations is a gradual shift towards grade I, the symptom-free group, at the expense of grades II and IIIs. There is improvement and not deterioration of results with the passage of time, for the proportion of symptom-free patients has increased from 47% at 6 months to 63% at 42 months. This improvement is at the expense of grade II and is therefore masked in the summary.

The six months to twelve year report does give a reasonably accurate impression of results at any time after operation, but it shows too favourable an impression of early results.

There is still one drawback to this method of analysis. It does not indicate if there has been any difference between the results of the earlier and later operations included in each six-month review.

During the twelve years covered by this survey minor details of technique have been modified, post-operative treatment has improved, and selection of patients for operation has become more rigorous. The combined effect of these factors can only be shown by reporting the incidence of failures among separate groups of 100 patients at each six-monthly survey (table VIII).

TABLE V—SUMMARY OF TABLE IV EXPRESSED IN PERCENTAGES

Grade	D.U.	G.U.	G.D.U.	S.U.	Whole series
I–II Excellent	78·6%	79·2%	83·3%	74·2%	78·7%
IIIs Satisfactory ..	16·3%	18·9%	14·0%	16·1%	16·4%
	94·9%	98·1%	97·3%	90·3%	95·1%
IIIu–IV Unsatisfactory ..	5·1%	1·9%	2·7%	9·7%	4·9%

The first column in table VIII shows the number of failures in each group at six months after operation, and indicates that fewer failures have occurred in the last two groups. This is in part due to a more rigorous selection of patients for operation, and in part to a more intense follow-up treatment during the first six months after operation.

The first three groups include a high proportion of failures. During this period we accepted patients with a pronounced neurotic overlay to find out if it were possible to produce a good result under such conditions. The experiment was not successful. Though excellent

TABLE VI—GRADING AT SIX-MONTH SURVEYS OF PATIENTS AVAILABLE FOR FOLLOW-UP

Grade	No. of patients seen at—							
	6 months	12 months	18 months	24 months	30 months	36 months	42 months	6 months to 12 years
I	211 (47·4%)	200 (51·5%)	171 (51·0%)	166 (58·7%)	136 (61·3%)	99 (65·6%)	46 (63·0%)	269 (62·1%)
II	152 (34·1%)	122 (31·4%)	102 (30·4%)	63 (22·3%)	44 (19·8%)	28 (18·5%)	18 (24·7%)	72 (16·6%)
IIIs	63 (14·1%)	48 (12·4%)	44 (13·1%)	38 (13·4%)	29 (13·1%)	15 (9·9%)	7 (9·6%)	71 (16·6%)
IIIu	15 (3·4%)	12 (3·1%)	10 (2·9%)	11 (3·9%)	4 (1·8%)	6 (4·0%)	0 0	12 (2·8%)
IV	4 (0·9%)	6 (1·5%)	8 (2·4%)	5 (1·8%)	9 (4·1%)	3 (2·0%)	2 (2·7%)	9 (2·1%)
Total followed up	445	388	335	283	222	151	73	433
Op. D ..	25	24	21	19	14	9	9	25
Late D ..	2	2	1	1	1	0	0	2
Int. D ..	0	2	4	4	7	6	6	12
Lost ..	3	2	2	2	2	2	0	3
Total ..	475*	418	363	309	246	168	88	475*

* 25 patients under six months not included.

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results were obtained in some men with unstable temperaments, the trial has left us with too large a legacy of failures.

At twelve months after operation the number of failures in the first group of 100 patients has risen to 7, 3 new failures (+3) and no responses to treatment (−0). By the 42nd month only 2 patients remain failures.

In spite of early operative inexperience, the late results of the early series are just as good as the early results of the later series, once the recurrent ulcers have been dealt with by secondary gastrectomy.

Such tables can only be completed when the whole of each group of 100 cases passes the six-month period. This time lag explains why only 17 of our 21 existing failures are shown.

The actual figures recorded in December, 1947, show that 43 patients (8·5% of the original 500) have at some time been graded a failure. Of these, 22 have responded to treatment, and 21 (4·9% of those available for follow-up) remain failures at their last examination in 1947.

Table VII shows that at each six months survey the total incidence of failures remains about 5%. Table VIII brings out the point that the individual patients constituting this 5% are constantly changing. At each new survey a few patients, previously graded satisfactory, become failures, and these are balanced by an equal number of failures who have responded to treatment.

As a result of the continuous follow-up we have two groups of failures for study—the temporary past failures and the existing failures, of whom some are permanent failures and some will prove to be temporary failures.

Permanent failures are identified early, often while still in the ward immediately after operation. They remain failures as long as they are followed up. Most of these are failures of selection for gastrectomy rather than failures of gastrectomy. They would be failures after any treatment, for they have failed to adjust themselves to life.

TABLE VII—SUMMARY OF TABLE VI

Grade	Percentage of patients seen at—							
	6 mths.	12 mths.	18 mths.	24 mths.	30 mths.	36 mths.	42 mths.	6 mths.-12 yrs.
I & II ..	81·5	82·9	81·4	81·0	81·1	84·1	87·7	78·7
IIIs ..	14·1	12·4	13·1	13·4	13·1	9·9	9·6	16·6
IIIu & IV ..	4·3	4·6	5·3	5·7	5·9	6·0	2·7	4·9

Temporary failures can occur at any time after operation and they can be recruited from any one of the three satisfactory grades. (Case 1 has recently been graded a temporary failure eleven years after operation, but she soon responded to treatment.) The duration of temporary failure is seldom more than twelve months (15 lasted 6 months, 5 lasted 12 months, and only 2 lasted 18 months). There has so far been no tendency to see-saw in and out of the failure group. Once they responded to treatment they have not again failed—but they may do so when they have been followed for a longer period.

The total incidence of permanent failures has remained constant, and has been determined by the sixth month (2·5%). The total incidence of temporary failures increases with the length of follow-up, but the proportion of temporary failures has remained about 2·5% at each six-monthly review, irrespective of the time elapsed since operation.

Apart from recurrent ulcer, the cause of failure is more likely to be found in the social conditions under which the patient is living than in the technique of operation. Follow-up of these patients has taught us

TABLE VIII—INCIDENCE OF FAILURES AMONG SEPARATE GROUPS OF 100 PATIENTS AT SIX-MONTHLY INTERVALS

Case nos.	6 months	12 months	18 months	24 months	30 months	36 months	42 months
1–100	4	7 +3 −0	6 +1 −2	3 +1 −4	3 +0 −0	3 +0 −0	2 +2 −3
101–200	4	7 +4 −1	5 +1 −3	5 +3 −3	4 +1 −2	6 +2 −0	..
201–300	7	6 +0 −1	5 +1 −2	5 +1 −1	..	..	..
301–400	1	2 +1 −0	..	..	..	..	..
401–500	2	..	..	..	..	..	..

Each group refers to 100 original cases, not to 100 patients available for follow-up at each survey.

Case nos.	Total ever failures	Total responded to treatment	Existing failures
1–100 ..	11	9	2
101–200 ..	15	9	6
201–300 ..	9	4	5
301–400 ..	2	0	2
401–500 ..	2	0	2
Total ..	39	22	17

that many factors are involved in the success or failure of surgical treatment. An improvement in results need not necessarily be ascribed to a change in technique. Many an unsatisfactory result has responded to a change of occupation, to separation from in-laws, or to the dissolution of an unhappy marriage.

The secret of success is team-work, and a high proportion of satisfactory results can only be maintained if there is very close coöperation between the doctors in hospital, the general practitioner, and the social-service worker.

RESULTS IN RELATION TO SEX

There is an impression that women do less well than men after gastrectomy. They seem to be more sickly and more liable to regurgitation of bile, to vomiting, and to the minor discomforts that follow gastrectomy. Table IX confirms this: 66% of men are entirely free of gastric symptoms, whereas only 37·5% of women are free. This difference between the sexes is masked when grades I, II, and III are considered together: 95·5% of

TABLE IX—RESULTS IN RELATION TO SEX

Grade	D.U.	G.U.	G.D.U.	S.U.	Total
Males					
I ..	186	22	21	19	248 (65·5%)
II ..	42	8	5	3	58 (15·0%) → 306 (80·5%)
IIIs ..	41	5	3	5	54 (15·0%) → (95·5%)
IIIu ..	9	0	0	2	11 (2·9%)
IV ..	5	0	1	0	6 (1·6%) → 17 (4·5%)
Total ..	283	35	30	29	377
Females					
I ..	10	7	3	1	21 (37·5%)
II ..	8	5	1	0	14 (25·0%) → 35 (62·5%)
IIIs ..	10	5	2	0	17 (30·4%) → (92·9%)
IIIu ..	0	1	0	1	2
IV ..	2	0	0	0	2 → 4 (7·1%)
Total ..	30	18	6	2	56

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TABLE X—RESULTS IN RELATION TO AGE AT OPERATION

Age (years)	10–19	20–29	30–39	40–49	50–59	60–69	70 and over	Total
No. of cases	4	34	120	156	90	27	2	433
No. unsatisfactory at any time since operation ..	0	2	12	23	3	2	0	42
No. still unsatisfactory in December, 1947 ..	0	2	5 (4·2%)	13 (8·3%)	1 (1·1%)	0	0	21 (4·8%)

men and 92·9% of women are considered "satisfactory" results.

Failures are slightly more common among the women: 7·1% compared with 4·5% for men.

Women are also more liable to postoperative anæmia and vitamin deficiency. The incidence of anæmia will vary according to the vigilance with which it is searched for. Very few patients complain of symptoms which suggest anæmia, but routine blood-counts prove that in 20% the Hb is less than 70%, and there is a response to iron therapy. In men anæmia is less common. No case of macrocytic anæmia has occurred in this series.

All these cases of anæmia have occurred in spite of the patients taking a full diet.

RESULTS IN RELATION TO AGE

Table X shows the distribution of failures according to age-groups, and the effect of treatment in the follow-up clinic since the original operation.

Among the 119 patients over 50 years of age there is only one persistent failure. The highest incidence

TABLE XI—INCIDENCE OF RECURRENT ULCER IN RELATION TO TIME SINCE OPERATION ON ALL TYPES OF ULCER

—	Months since operation					
	6	12	18	24	30	36
No. cases examined ..	445	388	335	283	222	151
Fresh recurrences ..	1	2	2	0	0	0
Total recurrences ..	1 (0·2%)	3 (0·8%)	5 (1·5%)	5 (1·8%)	5 (2·3%)	5 (3·3%)

of failure is in the 40–49 age-group. The 2 failures among the 38 patients under 30 years of age are both in severe neurotics, and it was a gross failure of judgment ever to have operated on them. In spite of treatment by the psychologist their condition shows no improvement. The very satisfactory result in the others under 30 years of age should encourage surgeons to advise gastrectomy early, as soon as it appears obvious that medical treatment is unlikely to be successful.

RECURRENT ULCER AFTER GASTRECTOMY

Five recurrent ulcers have been found resulting from the 505 gastrectomies in this series, giving an incidence of 0·9%. This is a very misleading observation, for the incidence of recurrence should be related to three factors: the time which has elapsed since operation; the extent of the gastrectomy; and the type of ulcer for which the original operation was planned.

Table XI gives the incidence of recurrent ulcer in relation to the time since operation but does not differentiate between operations of different extent.

Table II gives the incidence of recurrent ulcer in relation to time and extent of gastrectomy. The incidence of recurrent ulcer two years after operation now appears to be 3·7% after "two-thirds to three-quarters" resection, and no recurrent ulcer has been detected after the more radical resection. Since no recurrent ulcer has been seen arising later than eighteen months after operation, this group is selected for further analysis to determine the incidence of recurrent ulcer in relation to the type of ulcer for which the original operation was planned.

Table XII shows the incidence of recurrent ulcer in relation to all three factors—time since operation, extent of resection, and type of ulcer. Similar tables can be prepared at five-year and ten-year intervals when a reasonable proportion of patients have survived that length of time.

One other point must be taken into consideration—the number of patients lost sight of. If all patients lost sight of are assumed to have recurrences, this would give the highest possible recurrence-rate. The true recurrence-rate is somewhere in between that figure and the recurrence-rate actually noted. (In this series only 3 patients with duodenal ulcer were not traced.) If the

TABLE XII—INCIDENCE OF RECURRENT ULCER EIGHTEEN MONTHS AFTER OPERATION IN RELATION TO TYPE OF ORIGINAL ULCER

Extent of gastrectomy	—	D.U.	G.U.	G.D.U.	S.U.	All types
2/3–3/4	No. of patients examined	93	21	13	8	135
	No. of recurrent ulcers ..	3 (3·2%)	0	0	2 (25%)	5 (3·7%)
3/4–M.R.G.	No. of patients examined	148	20	16	16	200
	No. of recurrent ulcers ..	0	0	0	0	0

series contains a high proportion of untraced patients, as in a questionary call-up, the report will be of no value so far as recurrence-rate is concerned.

Table XII confirms the general impression that recurrent ulcer following gastrectomy for G.U. is extremely rare. A "two-thirds to three-quarters" gastrectomy was followed by recurrent ulcer within eighteen months in 3·2% of D.U., and 2 out of 8 S.U. which followed previous gastro-enterostomy. The high rate of recurrence following gastrectomy for S.U. proves how important it is to plan a really radical resection. For these ulcers all the vasa brevia should be divided, and a gastric remnant no longer than 2 in. should be left.

SUMMARY

The results of 505 consecutive gastrectomies observed in a continuous six-monthly follow-up clinic suggest that the protection against recurrent ulcer depends on the area of stomach left in situ and the integrity of its blood-supply.

Heuer et al.[1] report 5·3% recurrence after a "half to two-thirds" resection. In this series 3·7% recurrence

1. Heuer, G. J., Holman, C., Cooper, W. A. The Treatment of Peptic Ulcer. London, 1944.

TABLE XIII—SUMMARY OF RESULTS

—	D.U. and G.D.U.	G.U. and G.D.U.	S.U.	Remarks
No. of ulcers ..	402	113	35	—
Operative mortality	2·9%	5·4%	3·5%	3·7% of 430 operations
Late mortality ..	2 cases	0	0	1·5% of 433 patients
Lost trace of patient	3 cases	0	0	0·7% of 436 patients
Satisfactory	95·3%	97·8%	28/31	95·1% of 433 patients
Unsatisfactory ..	4·7%	2·2%	3/31	4·9% of 433 patients
Recurrence at 18/12 2/3–3/4 ..	2·9%	0	2/8	3·7% of 135 patients
Recurrence at 18/12 3/4–M.R.G.	0	0	0/16	0% of 200 patients

Combined G.D.U. are added in with both G.U. and D.U.

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followed a "two-thirds to three-quarters" resection, and no recurrence followed a three-quarters to measured radical gastrectomy in 350 cases.

The essential point of technique of a measured radical gastrectomy is division of all but one of the vasa brevia and all branches of the left gastro-epiploic artery. This makes it possible to leave a small devascularised gastric remnant $1^1/_2$ in. and 3 in. long on the lesser and greater curvatures respectively.

A measured radical gastrectomy differs from a conventional three-quarters resection in three respects: (1) the area of stomach which remains can be measured and controlled with accuracy; (2) the gastric remnant is extensively devascularised; and (3) in 98% of cases permanent relative achlorhydria is produced.

The operative mortality for the last 430 gastrectomies was 3·7% (D.U. 2·9%, G.U. 5·4%, S.U. 1/29).

A penetrating ulcer caused twice the operative mortality of a non-penetrating ulcer.

If the history was over five years, the operative mortality was increased $2^1/_2$ times.

One patient among 155 under the age of 40 died (0·7%). The operative mortality among patients aged 40–49 was 5%, aged 50–59 5·8%, and 60 and over 7·1%.

Of the 430 patients examined from six months to twelve years after operation 95·1% showed satisfactory results (D.U. 94·9%, G.U. 98·1%, S.U. 28/31). The year-by-year continuous follow-up indicates that results improve with time, provided the follow-up is intensive; the proportion of patients who are symptom-free at 6 months (47%) rises to 63% at 42 months after operation.

Women were more liable to have minor symptoms resulting from operation; 66% of men and only 37% of women were symptom-free. The incidence of failure was 4·5% among men and 7·1% among women.

The highest incidence (8·4%) of failures was in the 40–49 age-group. There was one failure in the 119 patients aged over 50.

In spite of wide resection no case of macrocytic anæmia has been discovered.

It is important to specify the exact extent of resection when reporting results. Recurrent ulcer should be discussed in relation to the extent of resection, the time that has elapsed since operation, and the type of ulcer for which the operation was planned.

No ulcer recurred later than eighteen months after gastrectomy.

It is a great pleasure to acknowledge the debt I owe to my colleagues. The work of a gastric unit depends primarily on the efficiency of the radiologist. Dr. C. N. Pulvertaft was correct in his radiological diagnosis in 93% of these cases (a figure seldom equalled) and has attended every follow-up clinic. Dr. D. R. Cameron, by his shrewd criticism and advice, has ensured that the grading has been fair, and many of his suggestions have been adopted. Dr. G. A. Haydock, our anæsthetist, has provided uniformly perfect operation conditions. I particularly wish to mention the sisters in charge of surgical wards, to whose skill many of these patients owe their lives.

"... My own sense of what is practical is something much more modest than universal regular and compulsory mass radiography. It would develop in two directions. The first is to provide facilities so that all persons with illness which takes them to hospital or a private doctor can be radiographically examined as a routine part of any medical examination ... this policy is immediately called for in all public hospitals and should be the first call on mass radiography equipment. ... The second line of approach is through tuberculin testing in the schools. If all children entering school at the age of five or six years were tested for reactivity, a valuable clue to the existence of excretors of bacilli in the homes of reacting children would be obtained. A child of six with a positive Mantoux reaction is not likely to have been infected elsewhere than in the home, and the detection of the infector ... might diminish one of the most important dangers."
—Dr. F. M. BURNET, F.R.S., *Med. J. Aust.* Jan. 17, p. 62.

STERILE SPLENIC ABSCESS AFTER RELAPSING FEVER

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THE seven cases on which this paper is based were treated and studied in the surgical section of Prof. El-Katib Bey in Kasr-El-Ainy University Hospital. The patients were admitted between April and June, 1946, during the decline of the epidemic of relapsing fever that attacked Upper Egypt during the winter of 1945–46. The rarity of splenic abscess in relapsing fever perhaps condones the wrong diagnosis of the initial cases, one or two of them being regarded as retroperitoneal sarcoma, renal swelling, and the like. The true condition, however, was soon realised and aroused deep interest, especially when its relation to relapsing fever was appreciated.

Case 1.—A farmer, aged 20, was admitted on April 15 with $1^1/_2$ months' history of a mass in left upper abdomen, which had been diagnosed as a retroperitoneal sarcoma.

Patient had had relapsing fever 3 months before admission but had received no treatment. Two weeks after the subsidence of the fever he had felt in left lower chest sudden severe pain which gradually subsided. After an uncertain period he had noted the swelling, which continued gradually to enlarge.

On admission: temperature 98·6°F; pulse-rate 82; no evidence of toxæmia. A painless fluctuating swelling with smooth surface and rounded margins was found extending from under left costal margin to just below and to right of umbilicus; it was fixed, did not move on respiration, and was dull on percussion. Liver could be felt 2 finger-breadths below ribs but was not tender. Traube's area dull on percussion; otherwise nothing abnormal detected in chest.

Blood showed evidence of secondary anæmia: white cells 16,400 per c.mm. (polymorphs 52%, lymphocytes 30%, eosinophils 16%); no malaria or relapsing-fever parasites; Wassermann reaction positive.

Radiography: left cupola of diaphragm raised; no pleural effusion; urinary tract normal.

Treatment.—A course of penicillin with sulphadiazine and alkalis was given, and kaolin poultice was applied locally; but neither general nor local condition changed.

Operation.—Laparotomy (May 4), under spinal anæsthesia, through right paramedian incision.

A huge mass was found occupying the whole left side of abdomen and pushing stomach and intestines to right, with a whitish wall and firmly fixed to the anterior and lateral abdominal walls; its upper pole could not be reached. The lower pole was free and showed a rim of splenic tissue 2 finger-breadths wide. Transverse colon and tip of left lobe of liver were adherent to anterior surface of mass. Splenectomy was not done, because of extensive adhesions, and paramedian incision was closed.

A left subcostal incision was made 2 in. long and $^3/_4$ in. below and parallel to costal margin; the muscles were found to be œdematous.

Insertion of a needle into the mass yielded yellowish-green viscid odourless pus, containing many yellowish necrotic pieces. About 3·5 litres of pus was evacuated and mass rapidly shrank. Puncture was widened and interior of cavity explored; it was one-chambered with a shreddy irregular interior similar to that of a liver abscess. A tube was passed into cavity and wound closed round it.

Postoperative Course.—A further penicillin and sulphadiazine course was given, with injections of concentrated glucose and vitamins B and C. Discharge gradually decreased, drain being removed on 9th day.

Paramedian incision healed uneventfully, and patient progressed smoothly until May 21, when temperature suddenly rose to 101°F, and there was pain near sinus. Opening was enlarged, and discharge became again copious.

A full 'Cibazol' course was given; temperature subsided and remained normal from June 2. Discharge, however, remained copious and its culture showed *Staph. aureus.*

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A penicillin course was again given; condition gradually improved, but sinus healed slowly. Patient was discharged cured on Aug. 11.

Specimen of pus from spleen showed debris and necrotic material, with a moderate number of pus cells. No organisms found in film or culture.

Case 2.—A woman, aged 30, was admitted on April 27 with 2 months' history of a painless abdominal swelling. Condition had started with sudden pain in left chest, swelling appearing a few weeks after pain had subsided. Patient had had relapsing fever a few weeks before pain, and had received two injections of neoarsphenamine.

On admission: temperature and pulse-rate very little raised; no toxæmia or dyspnœa. Splenic mass felt like that in case 1. Liver was felt 3 finger-breadths below costal margin and was tender.

Radiography: left cupola of diaphragm raised; no pleural effusion.

Blood showed Hb 83%, white cells 6000 per c.mm. (polymorphs 46%, lymphocytes 40%, eosinophils 9%); no relapsing-fever or malaria parasites; Wassermann reaction positive.

Treatment.—In spite of kaolin poultices locally and a penicillin course no change resulted. Abscess was drained through left subcostal incision. Recovery was uneventful, and patient was discharged cured on June 13.

Pus showed red cells, amorphous detritus, few pus cells, but no organisms in film or culture.

Case 3.—A farmer, aged 40, was admitted on May 7 with a history of relapsing fever 3 months before, for which he had received no treatment. A week later he had felt in left hypochondrium and left shoulder sudden severe pain which subsided by itself. Two weeks later he had noted an abdominal mass, which continued to enlarge gradually. He had developed dyspnœa 2 weeks before admission.

On admission: patient was wasted and dyspnœic, with sallow toxic facies; temperature 100°F, pulse-rate 98; splenic abscess reaching to umbilicus; left pleural effusion, confirmed by radiography.

Blood: white cells 16,400 per c.mm. (polymorphs 85%); no malaria or relapsing-fever parasites.

Treatment.—A penicillin and sulphadiazine course was given, and abscess was drained through left subcostal incision, 2 litres of thick greenish pus being evacuated. Chest was aspirated on three occasions after operation, and patient was discharged cured on June 22.

Fluid from spleen showed many pus cells, debris, and gram-positive cocci. Culture gave *Staph. aureus*. Fluid from chest showed pus cells, but no organisms in film or culture.

Case 4.—A woman, aged 25, had had relapsing fever 4 months before admission and had received three injections of neoarsphenamine. History and clinical picture resembled that of case 2.

Abscess was drained through left subcostal incision, and a piece of mass, removed for biopsy, showed dense fibrous tissue with evidence of inflammatory origin. Most of the vessels were thickened, and a few presented the picture of obliterating endarteritis; there was also some perivascular cellular infiltration with round cells, lymphocytes, and mononuclears (fig. 1).

Pus from spleen showed plenty of amorphous debris, some pus cells, but no organisms in film or culture.

Case 5.—A woman, aged 22, had had relapsing fever, during which she had aborted 3 months before admission; she had received two injections of neoarsphenamine. Three weeks after the fever she had had pain in left hypochondrium, malaise, and a rise of temperature; these gradually subsided. After an uncertain period the mass was noted and gradually enlarged.

Clinical picture resembled the previous cases, except that patient ran a low-grade hectic temperature and splenic mass was less fixed.

White cells 10,600 per c.mm. (polymorphs 56%, lymphocytes 32%, eosinophils 8%). No malaria or relapsing-fever parasites. Wassermann reaction positive. Radiography showed left cupola of diaphragm raised.

Abscess was drained as in the other cases, and pus had same naked-eye and microscopical characters.

Case 6.—A boy, aged 12 years, was admitted as a case of left pleural effusion on April 15. He had had pain in lower left chest with cough for a week.

On admission: pallor, wasting, temperature 101°F, pulse-rate 124, respirations 38 per min.; Traube's area dull on percussion; lower left chest showed decreased air entry. Abdomen showed subcostal tenderness only. A history was obtained of relapsing fever a few weeks before admission.

Radiography: both sides of diaphragm raised, more on left; no evidence of pleural effusion.

April 20: liver felt 3 finger-breadths below ribs and tender. Erythrocyte-sedimentation rate 80 in 1st hour, and 135 in 2nd hour. Blood: Hb 33%; white cells 20,600 per c.mm. (polymorphs 75%, lymphocytes 19%, monocytes 4%, eosinophils 2%); no malaria or relapsing-fever parasites; Wassermann reaction positive.

April 27: spleen felt 2 finger-breadths below costal margin, tender, did not move on respiration, and had smooth surface and rounded borders. Liver felt 4 finger-breadths below ribs and tender.

Patient ran a low-grade hectic temperature. Spleen continued to enlarge, and there was definite fluctuation; mass nearly reached left iliac fossa.

Treatment.—Patient was given two blood-transfusions, tonics, iron, and injections of liver extract, vitamins, concentrated glucose, and calcium, and nutritious diet; a penicillin course was also given. General condition greatly improved, but swelling showed no change. Drainage was instituted through left subcostal incision, and material was taken for biopsy. Patient developed left postoperative pneumonia, complicated by empyema; this was treated with sulphadiazine, penicillin, aspirations, and local instillation of penicillin. Patient was discharged on July 24.

Fluid from spleen showed pus cells and much debris, but no organisms in film or culture.

Biopsy Findings.—Necrotic tissue (figs. 2 and 3) but no evidence of any specific infection: no bacteria or spirochætes in especially stained sections.

Case 7.—A farmer, aged 25, was admitted in an emaciated, toxic, dyspnœic state as a case of hepatitis with an abscess in left lobe of liver and an effusion in left pleura.

There was no improvement on emetine treatment.

Needling of supposed liver abscess yielded dirty green pus unlike that of a liver abscess. Aspiration of chest yielded a straw-coloured effusion. Splenic abscess and left pleural effusion were now diagnosed.

Temperature 102°F, pulse-rate 134, respirations 40 per min. Chest showed a huge hydropneumothorax, with a considerable shift of heart's apex-beat and of trachea to right.

Abdomen much distended in upper part; liver felt a hand-breadth below costal margin and tender. Swelling in left hypochondrium extended from under costal margin to beyond umbilicus; its borders rounded, its surface smooth and overlapped by liver; it was fluctuant and dull on percussion, with an area of resonance at its top, which shifted when patient turned on his side. A succussion splash could be heard over the mass. "Pyopneumospleen" was diagnosed.

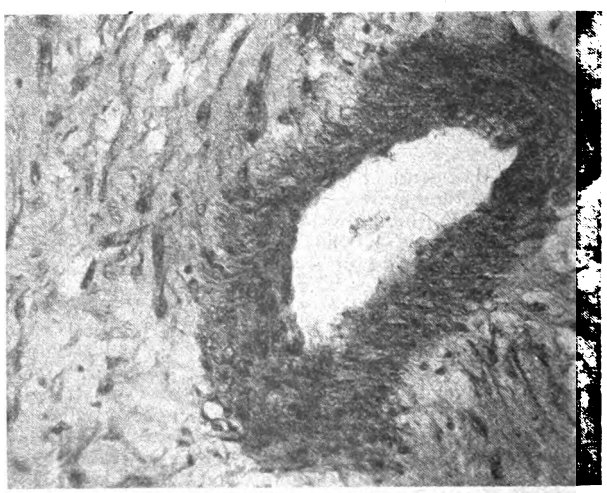

Fig. 1—Splenic tissue (case 4) showing fibrosis, thickening of blood-vessel wall, and round-celled perivascular infiltration. (× 400.)

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Operation.—Paramedian exploration showed splenic mass to be very adherent and fixed; liver was much congested; more than 4 litres of pus was evacuated.

Treatment and Progress.—A blood-transfusion was given, along with penicillin, tonics, and vitamins; discharge decreased rapidly; wound healed in 3 weeks. Chest effusion, which required aspiration, was sterile. Pus from spleen showed numerous pus cells, with some red cells and degenerated debris, but no organisms in film or in culture.

DISCUSSION

Incidence.—The patients presented themselves when the epidemic of relapsing fever was dying out. The splenic condition in each patient developed some time after the subsidence of the fever; the shortest interval was a week, but the average was 2–3 weeks. The three females had received neoarsphenamine, but the four males had not had any treatment. The frequency of the complication cannot be high; in 3000 consecutive cases of relapsing fever treated in Imbaba fever hospital during the epidemic of 1945–46 El-Ramly [1] found only 23 (0·77%) of splenic abscess. In 139 fatal cases splenic infarctions were found at necropsy in 28 (20%), of which 16 (11·5%) showed abscess formation. The youngest patient in the present series was aged 12 years, and the oldest 40; most of them were in their third decade. There were 4 males to 3 females.

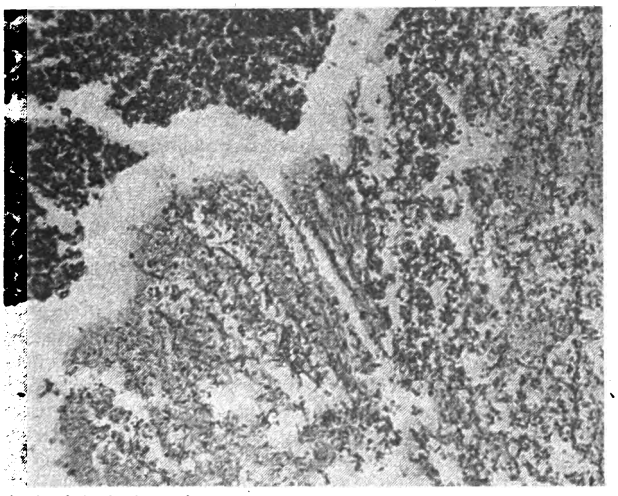

Fig. 2—Splenic tissue (case 6) showing necrosis and infiltration. (× 240.)

Onset was more or less uniform in all cases, the patient experiencing sudden pain, described as severe by most, under the lower left ribs; in some cases it was referred to the left shoulder or to the epigastrium. The pain was stabbing and gradually subsided in most cases without treatment. A moderate rise in temperature and malaise accompanied the onset in some.

Subsequent History.—In all the cases there was an interval, after the pain had subsided, before the abdominal swelling was noted; in some cases it was a few weeks or a month, but in others it was indefinite. In most cases the mass was almost painless and it was only after it had become very big that the patients sought medical advice, usually 1–2 months after the first onset of the pain. Case 6 first sought advice for pain in the chest and cough, and at that time there was no mass palpable in the abdomen; the mass developed in hospital 3 weeks after the onset of the pain. Possibly this is the length of time taken by the spleen in this class of case to reach a size when it can be noted by the patient.

General Condition.—Where no chest complications were present, there was no change in general health, pulse, or temperature. When the chest was implicated, the patient had fever, dyspnœa, raised pulse-rate, and evidence of toxæmia.

1. El-Ramly. *J. Egypt. publ. Hlth Ass.* 1946, **21**, 150.

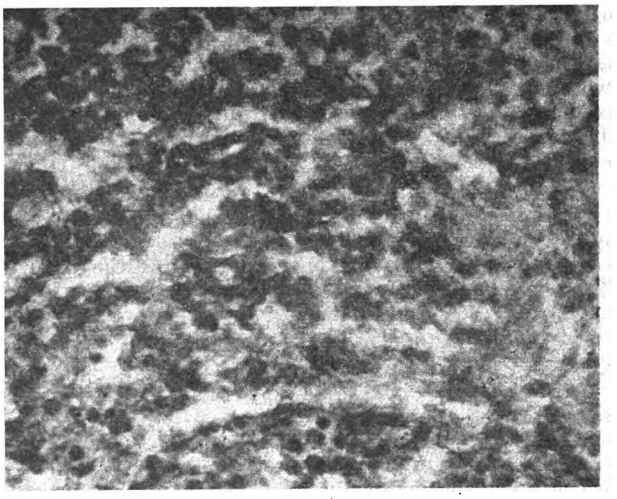

Fig. 3—As fig. 2. (× 500.)

Abdomen.—In most cases the liver was enlarged and tender, sometimes more tender than the spleen, and on occasion was associated with dragging pain in the right hypochondrium. The splenic mass differed from the usual type of splenic enlargement in that: (1) it did not move on respiration, but was firmly fixed; (2) its borders were rounded; (3) a notch was felt in one case only; (4) it felt cystic; (5) it was tender in the early stages, but gradually the tenderness disappeared; and (6) Traube's area was dull, even in cases with no effusion in the left pleura. Dullness in Traube's area was present in case 6, before the spleen was clinically palpable. In case 7 there was shifting dullness inside the spleen due to the presence of fluid and gas, which was probably air which had gained entrance during attempts at aspiration. The size of the spleen varied greatly, the smallest reaching a finger-breadth above the umbilicus, the largest nearly to the right iliac fossa.

Complications.—Pleural effusion was already present in 2 cases when first seen, and repeated aspiration was needed before it disappeared. In both cases the effusion was sterile.

Diagnosis.—In the early period some of the cases were variously diagnosed as retroperitoneal sarcoma, renal swelling, &c., but with a little experience the correct diagnosis was made. Case 6 was the only patient who came under observation still complaining of the initial pain, while the spleen was not yet clinically enlarged. The case closely resembled pleurisy with effusion, for which it was mistaken at first.

Radiography always showed a raised immobile left dome of the diaphragm. The right cupola was also raised in some cases, probably owing to congestion of the liver in the early stages (case 6).

Hæmatology.—No malaria or relapsing-fever organisms were discovered in any of the cases. The leucocyte-count varied. Apart from secondary infection (case 3, where the polymorphs reached 85%), there was no rise in the polymorphs, even in cases with a high white-cell count. There was a tendency to lymphocytosis and eosinophilia. The erythrocyte-sedimentation rate was raised, and the Wassermann reaction was positive in the four cases in which it was tested.

Treatment.—The earlier cases were given penicillin and/or sulphadiazine before operation, but not the later series of patients; chemotherapy made no apparent

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difference. Unless there was evidence of toxæmia from secondary infection, no special therapy seemed to be required before operation. Splenectomy is sometimes advised for splenic abscess, but in the present cases it would have been utterly impossible; the fibrosis was so dense and the mass so fixed to surrounding structures. The abscess was drained through a separate left subcostal incision.

Postoperative Treatment.—Unless secondary infection is already present or develops in the wound later, no penicillin or sulphonamide is needed. In uncomplicated cases mere drainage of the abscess cures the patient. The pleural effusion found in some cases required repeated aspiration. The postoperative complications were left pneumonia followed by empyema, and secondary infection from sinus.

Operative Findings.—The spleen was found transformed into a big sac with a dense white fibrous wall. The rim of splenic tissue found at the lower border confirmed that the mass was splenic. The special feature was the dense fibrosis, which fixed the mass to the surrounding parietes. The lower pole was free, and the transverse colon and the tip of the liver were only moderately firmly fixed to the anterior surface. The abscess cavity in most cases was single, with its inner surface lined with shreddy necrotic material, and its wall tough and fibrous. The liver was enlarged and in some cases much congested.

Pus.—The naked-eye appearance of the pus was uniform in most cases: dull greenish-yellow, viscid, and slimy. It was odourless. It contained plenty of yellowish necrotic shreds of different sizes. The pus was sterile in 6 out of 7 cases; in case 3 *Staph. aureus* was discovered. Microscopically there was an abundance of necrotic debris. Pus cells were numerous in some cases and scanty in others.

Pathological Findings (Dr. S. M. Aidaros).—Early lesions showed much necrosis and aseptic suppuration (figs. 2 and 3) compatible with the formation of a sterile abscess but not hitherto described in relation to relapsing fever. Late lesions were characterised by advancing fibrosis with thickening of arterioles, obliterative endarteritis, and perivascular cuffs of round-celled infiltration, mainly lymphocytes (fig. 1). The necrosis is due to infarction, which is well known to develop sometimes in relapsing fever. The interesting feature here is its massive character, most probably due to blocking of the main vessels to the spleen.

SUMMARY

Seven cases are described which show that sterile splenic abscess may complicate relapsing fever.

Infarcts and necrosis are known to develop sometimes in the spleen in relapsing fever, but little has been written about sterile splenic abscess due to relapsing fever in the last twenty years before the epidemic of 1945–46 in Egypt.

During this epidemic El-Ramly [1] found in 3000 cases of relapsing fever 75 (2·5%) of splenic infarction, of which 23 (0·77%) developed splenic abscess. In 139 fatal cases splenic infarctions were found at necropsy in 28 (20%), of which 16 (11·5%) showed abscess formation.

The condition is essentially sterile, but secondary infection may arise from any septic focus.

There is much cellular infiltration in the early stages, followed later by fibrosis at the periphery.

I wish to thank Prof. El-Katib Bey, in whose wards this work was done; my colleagues, Dr. Moustafa Kinawy and Dr. S. M. Aidaros; Dr. El-Ramly of the fever hospital; many others who in various ways contributed to the recovery of the patients; and Sir Gordon Gordon-Taylor for revising this paper.

REDUCING SUBSTANCES IN THE URINE IN PREGNANCY AND THE EARLY PUERPERIUM

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THE reducing substance frequently present in the urine of pregnant women is often assumed to be lactose. We have therefore tested specimens of urine obtained throughout pregnancy and in the puerperium for reducing substances, and have applied specific tests for the presence of lactose.

The urine was examined for the presence of reducing substances by heating 5 ml. of Benedict's qualitative reagent and 0·5 ml. of urine in a boiling-water bath for 5 min. If reduction took place, a test with ferric chloride was made to exclude salicyluric acid. All specimens in which reducing substances other than salicyluric acid were present were next tested by a modified form of the methylamine reaction for lactose described by Fearon (1942).

2 ml. of urine was boiled with 0·2 ml. of 10% sodium hydroxide, and 4 drops of 5% methylamine hydrochloride was added without subsequent shaking. A red colour was taken to indicate the presence of lactose. The reaction was found to be sensitive to the presence of lactose in urine in a concentration as low as 0·5%.

Harwood (1946) states that 0·1% lactose can be detected in the presence of 0·25% glucose, but that higher concentrations of glucose have a masking effect. We examined mixtures of glucose and lactose in urine with concentrations of lactose between 0·2% and 0·5%. When the concentration of glucose was half that of lactose, the methylamine reaction was much less definite; and, when the quantities of lactose and glucose were equal, negative results were obtained.

The phenylhydrazine osazone test was carried out on those specimens showing a fairly well-marked reduction with Benedict's qualitative reagent, the method used being that described by Harrison (1937). In some cases the results were inconclusive, and subsequent examination of specimens (not included in this series) by the technique described by Edson (1940) and recommended by Harrison (1947) suggests that this would have been a more satisfactory method for urine of such relatively low sugar content.

TABLE I—INCIDENCE OF REDUCING AGENTS IN URINE

Series of patients	No. of cases	No. of cases with reducing substance	No. of specimens	No. of specimens with reducing substance
Antenatal ..	123	118 (96%)	777	501 (64%)
Control ..	503	54 (11%)	503	54 (11%)
Postnatal ..	97	89 (92%)	258	210 (81%)

RESULTS

Antenatal Cases

Since the patients were attending an antenatal clinic, the exact timing of specimens in relation to meals was impossible. The specimens were those brought for routine examination at the clinic and were all morning samples. Samples of urine of 123 patients were examined at intervals throughout the antenatal period to the total number of 777. The number of samples from each patient ranged from 1 to 13, the majority being between 6 and 9.

Of these 123 patients, 118 (96%) showed some reducing substance on one or more occasions, and of the 777 specimens examined reduction took place in 501 (64%) (table I). Of these, 23 specimens contained about

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0·5% of reducing substance, 102 contained about 0·15%, and the remainder showed traces only.

Of the 501 specimens showing reduction, 14 (1·8% of the 777 samples investigated) were considered to contain salicyluric acid as shown by a positive ferric chloride reaction. The rest, tested by the methylamine reaction, all gave a negative result for lactose (table II).

TABLE II—INCIDENCE OF LACTOSURIA

Series of patients	No. of cases	No. of cases giving M.R. +	No. of specimens	No of specimens giving M.R. +
Antenatal ..	123	0	501	0
Postnatal ..	97	61 (63%)	197	112 (57%)

M.R., methylamine reaction.

Since the original object of this survey was to establish the incidence of lactosuria during pregnancy, all the specimens were not tested for the formation of an osazone, the negative methylamine reaction being taken as proof of the absence of lactose. However, glucose was identified in the urine of 13 patients by the formation of typical glucosazone crystals, and we feel that, had the specimens under review been examined by Edson's technique, many more positive glucosazones would have been obtained.

Controls

We examined 503 single specimens obtained from non-pregnant women for the presence of reducing substances. Known diabetics were excluded from the series, which was otherwise unselected. In 54 specimens (11%) reduction took place, as compared with 64% of the specimens from pregnant patients. Those which gave reduction were tested with ferric chloride and 11 were positive (2·2% of the total number examined).

Postnatal Cases

Urine from 97 patients was examined for reducing substances during the early weeks of the puerperium, the procedure being the same as that used in the investigation of antenatal patients. The total number of specimens examined was 258, the number from each patient varying between 1 and 6, the majority being between 2 and 4.

Of the 97 patients, 89 (92%) showed reducing substances on one or more occasions, and 210 (81%) of the 258 specimens examined gave a positive reaction (table I). In 5 specimens (1·9% of the total number examined) the reduction was shown to be due to salicyluric acid only. The methylamine reaction was carried out on 197 of the specimens which gave a reduction, and 112 (57%) gave a positive result (table II).

We tested 38 specimens for the formation of an osazone. In 18 typical lactosazone, and in 1 typical glucosazone, crystals were obtained. As in the investigation of antenatal urine, many gave an indefinite result, and crystals could not be identified in 19 of the specimens examined.

We examined 85 cases in the series during both pregnancy and the puerperium; 81 of these showed the presence of a reducing agent antenatally, and 78 postnatally, of which 53 gave a positive reaction for lactose. Winter (1931), in an examination of urine from 27 patients immediately before parturition, found a reducing substance, identified as glucose, in only 2. Of 29 samples of urine that he examined after delivery, 16 gave a positive test for sugar, which proved to be lactose.

It having been suggested (Harwood 1946) that the reducing substance in urine may sometimes be ascorbic acid, we tested a series of specimens containing various concentrations and found that concentrations of ascorbic acid up to 100 mg. per 100 ml. did not give a reduction with Benedict's reagent. Concentrations of 200 mg. per 100 ml. gave a slight reduction. We also found that Benedict's reagent was reduced by much lower concentrations of ascorbic acid in water than in urine.

SUMMARY

Patients were investigated during pregnancy and the early puerperium for the presence of reducing substances in the urine.

During the antenatal period a high incidence of reduction (96%) but no lactosuria was found.

In a control series 11% showed reduction.

In each series reduction due to the taking of salicylates was about the same.

During the puerperium 92% of the cases investigated showed reduction, and in 63% lactose was demonstrated by the methylamine test.

REFERENCES

Edson, N. L. (1940) *N.Z. med. J.* **39**, 39.
Fearon, W. R. (1942) *Analyst*, **67**, 30.
Harrison, G. A. (1937) Chemical Methods in Clinical Medicine. 2nd ed., London.
— (1947) *Ibid.* 3rd ed., London.
Harwood, J. A. (1946) *Bull. Inst. med. Lab. Tech.* **12**, 3.
Winter, L. B. (1931) *J. Physiol.* **71**, 341.

PRIMARY ATYPICAL PNEUMONIA

A SMALL HIGHLY INFECTIVE OUTBREAK

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IN August and September, 1946, an outbreak of atypical pneumonia occurred in a family who live a secluded life in an Irish country district. All members of the household, consisting of a farmer, his two sisters, and a domestic servant, were involved, and the attending physician also contracted the disease (see table).

The illness ran an essentially similar course in all five patients, apart from variations in severity. Case 2 was severe, cases 1, 3, and 5 were moderate, and case 4 was mild. The onset was sudden, with pyrexia (101–103·5°F), sweating, malaise, bone pains, and non-productive cough. Physical examination showed patchy dullness and coarse almost bubbling crepitations at the lung bases, most pronounced at the right side; there were no other physical signs. Except for case 2, the patients felt well after 3 days, but the fever persisted in a lesser degree for 8–12 days, and the cough and

PRIMARY ATYPICAL PNEUMONIA

Case no.	Patient	Age (years)	Date of onset of symptoms (1946)	Cold-agglutinin titrations	
				Days from onset of symptoms.	Titre
1	First sister	32	Aug. 1	29	1 : 64
				54	1 : 32
				98	1 : 8
2	Second sister	34	Aug. 14	14	1 : 1024
				26	1 : 512
				40	1 : 64
				84	1 : 16
3	Farmer	36	Aug. 18	10	1 : 256
				38	1 : 1024
				100	1 : 32
4	Domestic servant (female)	40	Sept. 8	3	Absent at 1 : 4
				17	1 : 32
5	Physician (male)	27	Sept. 25	5	1 : 32
				10	1 : 128
				44	1 : 4

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crepitations for a further few days. Recovery was complete in all cases.

There was a significant rise in cold-agglutinin titre during the illness, with a fall in convalescence. White-cell counts were within the normal range, and sputum examinations revealed no abnormal organisms. Radiography showed typical patchy opacities in the lower lobes, with radiating striæ from each hilus.

COMMENTS

This small outbreak shows a much higher degree of infectivity than is usual. After a vacation of some months at an Irish holiday resort case 1 returned to her home, infected the other members thereof and the only visitor, the physician. Young et al.[1] recorded 53 cases among 627 resident personnel of an institution—a case-incidence of 8·45%. In the Camp Claybourne outbreak Dingle et al.[2] reported an average of 88 cases per 100,000 per week during an epidemic period in June and July, 1942.

In the present outbreak an attempt was made to trace other cases among contemporary guests of the hotel at which case 1 was staying, but this proved unsuccessful.

A further point of interest is that all the patients in the present group showed a rise in cold-agglutinin titre. It is our experience that, though atypical pneumonia may or may not show a rise in cold-agglutinin titre, all cases arising from a single source tend to give similar findings in this respect.

1. Young, L. E., Storey, M., Redmond, A. J. *Amer. J. med. Sci.* 1943, **206**, 756.

2. Dingle, J. H., Abernethy, T. J., Badger, G. F., Buddingh, G. J., Feller, A. E., Langmuir, A. D., Ruegsegger, J. M., Wood, W. B. jun. *War Med.* 1943, **3**, 223.

Reviews of Books

Essai de physiopathologie thyro-hypophysaire

JACQUES MAHAUX, Brussels. Paris: Masson. 1947. Pp. 256. Fr. 530.

IT is well known that the thyroid and pituitary glands can modify each other's behaviour, but the details of their interaction have not yet been clearly defined. This is a region of physiology and pathology which might well be illuminated by a bold and imaginative synthesis of existing knowledge, and this is what Dr. Mahaux has attempted.

So far as its relations with the thyroid are concerned, the main function of the anterior pituitary is represented as being the production of a basic substance, to which he gives the name of *substance thyroxinaffine*. As the name implies, this substance readily combines with thyroxine to form a compound which—acting probably on the hypothalamus—produces all the effects which we ascribe to the thyroid hormone. If, however, there is for any reason a lack of thyroxine, the *substance thyroxinaffine* remains unsaturated and constitutes what we now know as the thyrotropic hormone. The main interest of the book lies less in the correctness or otherwise of this main thesis—which cannot at present be proved or disproved—than in the subsidiary explanations suggested for a variety of physiological and pathological observations. One of the most plausible is that which ascribes many of the symptoms of myxœdema, particularly the skin changes, to excess of pituitary activity rather than directly to lack of thyroxine. Dr. Mahaux has also an interesting explanation of the way in which so-called toxic nodular goitre (secondary thyrotoxicosis) produces its effects: his idea that it represents a thyroid which has failed to undergo the normal process of involution, as age advances, is supported by the histology of the goitre, which in no way differs from that of a non-toxic nodular goitre.

Dr. Mahaux's most challenging hypothesis, however, is that the thyroid crisis—whether spontaneous or post-operative—is not caused by an exacerbation of thyrotoxicosis but by an abrupt fall in the level of circulatory thyroid hormone. In practice, he claims, the routine postoperative administration of thyroxine prevents thyroid crises, and thyroxine can abort them if given in the early stages. He states that this method of prophylaxis has been used in some hundreds of cases, but offers no statistical analysis of its effects on pulse-rate and temperature in the postoperative period. When the thyroxine is discontinued there is often a rise in metabolic rate and pulse-rate which he regards as the result of a sudden fall in circulatory thyroxine, though it might equally be ascribed to the normal action of the drug, which would be expected to become apparent at about this time. He quotes a number of investigators who have described a very low level of serum protein-bound iodine in thyroid crises, but it is not clear whether this has in fact been the universal finding. It is also rather difficult to follow his claim that similar crises can be precipitated by thyroxine-lack due to thiouracil therapy. This is certainly not a common experience, and even his own case-reports do not sound altogether convincing.

The book contains many other original ideas of less importance, and is a stimulating work which will certainly interest anyone working in this field.

Surgery

Textbook for Students. (2nd ed.) C. A. PANNETT, B.SC., M.D., F.R.C.S., professor of surgery, University of London; director of the surgical unit, St. Mary's Hospital. London: Hodder and Stoughton. 1947. Pp. 769. 27*s.* 6*d.*

THE undergraduate student wants a textbook that is authoritative and comprehensive, lucid, and brief. Measured by these standards Professor Pannett's book is a good one. His standing as surgeon, teacher, and examiner makes his authority unexceptionable. He has reconciled comprehensiveness and brevity by a compromise. Although he covers the whole field of surgery (except that of the ear, nose, throat, and eye) he does so in the form of an outline and cuts out all possible detail such as operative technique and the less common diseases. He also leaves out related subjects, such as pathology and gynæcology, which are often included in textbooks of surgery but are separated in the examination; nor does he deal with tropical diseases, or anæsthesia. The remaining bare essentials of surgery are not left a ghastly skeleton but are set in the flesh and blood of readable prose, which increases the length of the book but adds greatly to its value by giving it perspective and character. Inconsistencies and overlapping are avoided by the single authorship. The illustrations are Professor Pannett's own drawings—clear, simple, and plentiful. In this second edition the essential features of the original book have been preserved, even though it has been completely revised and in part rewritten.

Roentgen Interpretation (7th ed. London: H. Kimpton. 1947. Pp. 398. 35*s.*).—The first edition of this little book appeared in 1919 when X-ray diagnosis was in its infancy, and despite the enormous advances of the last twenty years its size has not been increased. It can, however, still compete with many more elaborate and detailed volumes because (though there is intense concentration of material) Dr. G. W. Holmes and Mr. L. L. Robbins write easily and stick to basic principles of interpretation.

A Textbook on Pathology of Labour, the Puerperium and the Newborn (2nd ed. London: H. Kimpton. 1947. Pp. 514. 42*s.*).—Prof. C. O. McCormick in the preface to this new edition says that "the streamlining plan and the directness of presentation, together with detailed therapy in every instance, which characterised the original edition, appear to have had acceptable desirability." We can well believe it, for though it is too concentrated and disjointed for the average student, the book contains a wealth of information for the practical obstetrician. Some 11 illustrations have been redrawn and 91 new ones, 10 in colour, have been added. It is noteworthy that in the United States, as in Britain, the fall in maternal deaths from shock and hæmorrhage in the last few years has been less than one might expect considering the advances in the technique of blood and plasma transfusion.

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THE LANCET

LONDON: SATURDAY, APRIL 10, 1948

Safeguards

THE week has brought new hope of agreement between the Government and the profession. On the eve of Parliament's reassembly the Royal College of Physicians published its resolution of March 22, which said:

> The college affirms its desire for unity and recognises that the comprehensive health service cannot be successful without the willing coöperation of all branches of the profession. The college believes that this can be furthered if the Minister of Health makes clear in an amending Act that a whole-time service shall not be brought in by regulation; so that if any future Government desires to introduce such a service a fresh Act of Parliament would be required.

This resolution, and another (printed on p. 579) suggesting that regulations under the Act might be made subject to special procedure, have received the general approval of the councils of the two other English colleges. They were based on the belief, already expressed by the Royal College of Physicians of Edinburgh,[1] that fear of the National Health Service Act "centres round the power of the Minister to alter by order or regulation the fundamental terms of service of the medical profession." To the majority of doctors the service is objectionable far less for what it is than for what it might become; and they rightly hold that no Minister should have power to alter its character, and the terms on which they take part, except by the deliberate decision of Parliament. The Government's acceptance of this limitation will go far to remove the anxiety so clearly reflected by the plebiscite. Quoting Mr. BEVAN's statement that he has no intention of introducing a full-time service, the B.M.A. say[2] that doctors "ask him to prove the good faith of this declaration by amending the Act accordingly so as to safeguard them against his changing his mind, and so as not to leave in the hands of future Ministers this tremendous power over doctors." With that proof we shall have a new situation.

In his letter to the Minister announcing his council's general approval of the Physicians' resolution, the president of the Royal College of Surgeons wrote:

> It is thought, however, that, while the legislation suggested would relieve members of the medical profession of one of their more serious apprehensions, it would not by itself be sufficient to secure the willing coöperation of all branches of the profession. It is therefore hoped that you will make such modifications in the present plans for the National Health Service, particularly in regard to the method of remuneration of general practitioners, as will bring them more into line with the views of the large majority of doctors and thus encourage members of the profession to give the service their general support.

By all those anxious to promote a settlement the Minister has been asked to give special consideration to the possibility of making the basic salary optional, and an advance in this direction must greatly improve the outlook.

1. *Lancet*, March 27, p. 495.
2. The Doctors' Case. From B.M.A. House, Tavistock Square, London, W.C.1. Pp. 15. 3*d*.

No responsible person could welcome the prospect of a conflict whose only certain outcome is division and ill feeling within the profession. Moreover, most doctors, though they may doubt the wisdom of the Act, in part or whole, would loyally do their best to make it work if in so doing they need not feel themselves false to a great past. Unfortunately, "when hot for certainties in this our life" we must always receive a somewhat dusty answer: in a dangerous world no legislation could permanently guarantee the complete freedom of judgment, speech, and action that are evident necessities if medicine is not to degenerate. We can fairly ask for safeguards against arbitrary alteration of the existing scheme, which contains elaborate mechanisms for the maintenance of freedom, but we must not blind ourselves to the fact that free and civilised institutions can be preserved only by making them work. On a long view, the true danger to medicine in this country is that the National Health Service, with its complex checks and balances, may fail. Professional freedom depends on its success.

Latent Period of Cancer

SEVEN years ago papers analysing the latent period of experimental tumours began to appear here and in the U.S.A. This attack on one of the many mysteries of cancer has continued, and BERENBLUM and SHUBIK[1] have lately given an account of the present position. The process of neoplasia is now divided into two phases—the initiation of malignant cell change, and the promotion of malignant cell proliferation. The first is irreversible but capable of latency; the second is reversible and susceptible of regulation. It is a fine achievement, on the part of ROUS and his collaborators[2 3 4] in America and of BERENBLUM[1 5] in Oxford, to have penetrated the confused origins of tumours so far as to separate these two phases. The original data were elicited with characteristic deftness and simplicity by ROUS and KIDD,[2] who observed the appearance, disappearance, and reappearance of tar warts on rabbits' ears under varying conditions. These warts are true neoplasms, but they require continued aid if they are to persist. A few interrupted applications of tar will bring forth enormous numbers of warts, almost all of which will disappear if tar is then withheld. Nevertheless, the cells of the epidermis from which they were derived remain neoplastic until cast off. The neoplastic change is hidden from macroscopic and microscopic sight, yet from the same area of skin where a wart has disappeared a recurrent one will often grow when the original tar stimulus is reapplied even after a long interval. ROUS and KIDD concluded that "tar has a marked effect to stimulate the proliferation of warts in addition to its ability to engender them." When the second stimulus after a pause is an indifferent instead of a cancer-producing one the result is often the same. Irritants such as turpentine or wounding, which by themselves never cause tumours, will also provoke the latent irreversibly changed cells into activity once more. Cell proliferation, the sign by which we recognise malignant change, may, strangely enough, be the product of a

1. Berenblum, I., Shubik, P. *Brit. J. Cancer*, 1947, **1**, 379, 383.
2. Rous, P., Kidd, J. *J. exp. Med.* 1941, **73**, 365.
3. Mackenzie, I., Rous, P. *Ibid*, p. 391.
4. Friedewald, W. F., Rous, P. *Ibid*. 1944, **80**, 101, 127.
5. Berenblum, I. *Cancer Res.* 1941, **1**, 75, 825.

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less specific action than the essential invisible alteration without which there can be no continued proliferation. This holds good only for these particular tar warts and possibly a few other kinds.

It is the highly conditioned nature of tar tumours that enabled ROUS and KIDD to reveal the two phases of neoplasia. Papillomas and warts of mouse skin are almost all progressive, without further aid, from the time they first appear. But variation in incidence and latent period can be achieved by applying synthetic carcinogens in lower doses and more dilute solutions than those which will produce the largest number of tumours most quickly. BERENBLUM's [5] original experiments with some of these substances indicated that suboptimal doses of carcinogen followed by treatment with croton oil would increase the incidence of tumours above that to be expected from suboptimal stimulation alone in a given time. By an improved technique the distinction between initiating and promoting actions has been demonstrated even more certainly, and by separately varying the conditions relating to carcinogen or promotor the potency of each has been measured. The new technique arose out of an observation of MOTTRAM's, since confirmed by BERENBLUM in much larger numbers of mice—that a single application of a carcinogenic chemical will initiate malignant change in a large proportion of animals treated, perhaps half the number to be expected from repeated applications for an optimal period. The malignant change resulting from a single dose is not revealed unless the promoting action of croton oil is brought into play. Nevertheless it is there, for croton oil alone has no initiating action or capacity to promote continuous proliferation. The terminology originally used to interpret these events was confused and has since been abandoned in favour of that of ROUS and KIDD. It was further found that when the croton-oil treatment was kept constant, but different carcinogens in different concentrations were used for the initial single painting, the tumour incidences varied from group to group but the average latent period remained the same. On the other hand, when the initial painting with the carcinogen was kept constant but the croton-oil treatment was delayed for different periods (up to twenty weeks), the tumour incidence remained the same but the latent periods varied, roughly according to the length of the delay. It appears that such results could have arisen only if the ultimate number of tumours was predetermined by the single preliminary action of the carcinogen, which must then act very rapidly, and that the latent tumour cells produced in the first instance did in fact remain latent until stimulated to multiply.

The data obtained point to a new way of estimating the potency of carcinogenic agents and incidentally to a possible way of economising in these substances. The effective response to a single dose is a measure of the initiating action when subsequently stimulated with croton oil. This might be stepped up to a maximum by measured increases. The average latent period is a measure of the promoting action of croton oil. It seems likely that we have here in the experimental field a basis for an explanation of chronic irritation in clinical and speculative fields. The chronic irritant is a promotor whether it is identical with the initiator or whether unspecified in kind. Among known promotors croton oil appears to take first place, but turpentine, chloroform, products of bacterial infection, and wound healing are also effective.

This conception of carcinogenic action will be a valuable guide in the assessment of the parts played by the various agents in tumour formation. By its light the neoplastic capacity of cosmic rays—if they have any—may well prove to be that of promotion rather than initiation. It may also have a bearing on the limited regulative capacity of hormones on tumours—for example, the modifying action of stilbœstrol on some prostatic carcinomas, and the temporary checking effect of withholding œstrogens on some mammary tumour transplants.[6]

The Local Medical Committee

ON looking at the regulations summarised in our last issue and on p. 569 one is struck by the diversity of duties entrusted in the National Health Service to the "local medical committee," which is the direct successor of the present local medical and panel committee. By the Act itself this committee is empowered to nominate the medical members of the executive council, and under the regulations it is also to nominate the medical members of service committees. It must be consulted about the establishment of distribution and allocation schemes, and can ask for their later emendation. It is to be kept regularly informed of the state of the medical list, and consulted over the filling of practice vacancies. It is the arbiter in questions concerning the charging of fees to patients for services, or for drugs and appliances. It inquires into allegations of excessive prescribing, of lax certification, or of deficiencies in record keeping. It hears complaints made by one medical practitioner against another. It provides half the members of the allocation committee and of the local obstetric committees. And it must be consulted by the executive council before any change is made in the terms of service of the general practitioner. Already in most areas local health authorities (acting on the Minister's recommendation) have sought to strengthen their health committees by coöpting members of the local medical committee, and we understand that regional hospital boards have begun to ask local medical committees for nominations to hospital management committees.

All these are important functions, and they are to be performed by committees which retain freedom to arrange and conduct their own affairs. All that the Act says is that where the Minister is satisfied that a local committee formed for the area of any executive council is representative of the medical practitioners of that area he may recognise that committee, which shall then be called the local medical committee and shall exercise such functions as may be prescribed for it. It is left open to the practitioners in each area to constitute and elect their own committee in the ways they think best. Once formed and recognised, the committees will enjoy complete autonomy. In one important respect, however, they will be at a disadvantage compared with the

6. Foulds, L. *Brit. J. Cancer*, 1947, 1, 262.

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local medical and panel committees which have so long and so smoothly discharged similar though less extensive duties: they will have no statutorily provided funds from which to pay the expenses of their officers or members. Under the National Health Insurance Acts, a sum of up to 2*d.* per patient per year could be levied from the practitioner's remuneration to provide a fund from which the expenses of the committee could be met. The new Act makes no such provision, and it will therefore be necessary for the local medical committees to obtain the consent of their constituent practitioners to a voluntary levy from their remuneration to meet these expenses, which now, owing to increased duties probably involving more frequent meetings (to say nothing of rising office and travelling costs), may well be higher than in the past. Any such levy—needing, as it does, to be deducted at source by the executive council—would probably have to be arranged by a voluntarily signed request sent by each practitioner to the clerk of the council. In other words, each doctor would have to "contract in" to pay this levy; for it is doubtful whether the council would be able, or if able willing, to agree to the alternative of making the levy universally except where the practitioner "contracted out" of paying it.

This financial problem will doubtless be one of the first of the domestic difficulties the local medical committees will need to solve. In view of the considerable services, and the protection, they will be giving their constituents, they may fairly expect every practitioner to be willing to pay his share. That the practitioner should be effectively represented is a necessity for the health of the new scheme.

Mosquito Eradication Schemes

THE remarkably successful campaign against the mosquito *Anopheles gambiæ*, the African malaria vector, directed by F. L. SOPER and D. BRUCE WILSON in Brazil a few years ago, was of more than immediate or local value, for it encouraged similar attempts elsewhere. The "control" of mosquito vectors of disease, as previously practised, consisted merely in keeping the numbers of dangerous species below the critical level; but now for the first time complete extermination from an area was shown to be a practical possibility—in the particular circumstances. It will be remembered that in Brazil *A. gambiæ* was an invader from tropical Africa; in Egypt in 1943 the eradication scheme was also directed against an invader (the same species) from the Sudan; in Cyprus and Sardinia, however, where eradication operations are now proceeding, the malaria vectors are indigenous. The disadvantage of having to deal with well-established species may to some extent be offset by the fact that these places are islands, and the present workers have an advantage over the pioneers in possessing the synthetic insecticide D.D.T., which is cheaper and less laborious to apply than paris green or oil, though these substances may still have to be used under some conditions.

In contrast with the earlier control methods, which were more leisurely, total eradication involves something like a blitzkrieg, where every detail is thought out beforehand and a start is made only when all possible preparations are completed. Once begun, the work is carried on at tremendous pressure, continuously and unrelentingly to its final conclusion. The mental and physical strain, on administration and workers alike, is heavy, and many difficulties and complications, some seeming deceptively trivial at first sight, have to be overcome at short notice. A thorough knowledge of local anopheline mosquitoes and their habits is of course essential. The wholehearted coöperation of the local authorities must be secured, so that once they have been persuaded that the total eradication of malaria vectors has a reasonable chance of ultimate success there will be no lack of funds; for the initial capital outlay is comparatively large. Plans must be made for the campaign to be continued for two, three, or more seasons. Experience in Greece and Cyprus has shown that the population, though they may not be particularly interested in eradicating mosquitoes and malaria, their old familiar enemies, may be won over after the campaign has started when they see the effect of the D.D.T. treatment on flies, bugs, and other insect pests, and notice the consequent reduction in such diseases as typhoid and dysentery. (Precautions have had to be taken to protect bees and silkworms.) Those employed in the campaign must discard any ideas they have previously held about mosquito control and must become eradication-minded. The checking and counter-checking of each other's work, which forms a necessary part of the scheme, must be undertaken in good faith by everybody, without any mistrust or ill-feeling. A large number of forms, records, and instructions are involved, and the irritating but vital necessity for the punctual rendering of negative returns has to be impressed on every worker. There will inevitably be some desertions to less hazardous jobs, some sickness and neglect; and the organisation must be ready to act at once on such occasions. The actual operators will find their duties often dirty, tiresome, and strenuous; in Cyprus, it has been found worth while to issue them with overalls, soap, boots, &c. Equipment should be simple, reliable, and strong but not heavy, for operators commonly spend long periods away in rough country; it should also be easily replaced and repaired, and should be designed to save the operators from too much stooping, which will lead to backache and the consequent missing of breeding-places which are difficult to reach. Special measures must be taken against the reintroduction of vector species by ships and aircraft and the transport of mosquitoes by vehicles from one zone to another. Each new place attacked will provide a fresh crop of local problems.

The campaign in Cyprus is now about to enter its third and perhaps final season. Here the chief anophelines are *A. sacharovi*, *A. superpictus*, and *A. claviger*. The Karpas peninsula was apparently cleared in the first season and the middle of the island in the second. The Sardinia campaign began in 1947 after a preliminary survey, made the year before, had shown that the main vector was *A. labranchiæ*. These projects are being keenly watched by administrators as well as epidemiologists in all the malarial countries, and it is to be hoped that similar schemes will soon be in operation in places like Mauritius, Zanzibar, and the West Indies.

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Annotations

CAREERS FOR THE OLD

THERE was a time when we could look sourly at older people who failed to retire "to make room for a younger man"; and it remains true that the old should not stand unfairly in the way of the young, preventing them from assuming their proper responsibilities and from earning their proper incomes. But in present circumstances the other side of this question is becoming more prominent. Life is lengthening and our working span with it, and the risk that a shrinking number of workers will have to support a growing number of their seniors would be diminished if the seniors postponed their age of retirement or made a habit of continuing employment of a less exacting kind.

A committee of three members appointed by the Liberal Party executive, including Lord Amulree, F.R.C.P., discuss possible changes in pensioning arrangements to encourage elderly people to stay at work.[1] They point out that the expectation of life for men, at 65, is some 11½ years, while for women, at 60, it is over 17. From next July those who work during the 5 years after these retiring ages will add to their pensions, when they finally retire, 1*s*. for every additional 6 months worked; and this, it is hoped, may encourage them to remain in regular work during those years. On the other hand, they will not have the benefit of the pension so long as they remain in regular work; nor will the pension be paid during these 5 years to anyone who retires but continues to earn more than £1 a week for occasional work. Payment of pensions to those in regular work does not begin till the age of 70 for men and 65 for women. The committee feel that while for many work is a source of "interest, contentment and happiness," there will be many men doing dull and exhausting work who will retire on £1 6*s*. a week at 65, rather than work 5 more years and secure an extra 10*s*. a week which they may not live to enjoy. The increment might, it is suggested, be increased to the full actuarial value of the deferred pension; or those who go on working might be credited with the amounts of their own and their employers' contributions, to be paid to them on their retirement, or to their executors. The committee have also studied other incentives—such as change to a more suitable job as age increases, and the provision of work which can be done at home.

In discussing the care of the ageing this report covers much familiar ground, urging that housing schemes should carry a proportion of homes for the old, that home helps and social visitors should be at hand to assist old people living alone, that meals and clubs should be provided, and that more homes and hostels are needed. It lays emphasis on recent medical advances in the treatment of old people's ailments, and notes the importance of "two-way traffic" between the residential home and the hospital where active treatment can be given. Besides setting out the newest thoughts about the care and comfort of the aged, it asserts the value of elderly people to a busy country and hopes to see that value enhanced.

TOXIC PLANTS USED FOR FOOD

THE triad of weakness, facial œdema, and jaundice after eating large quantities of certain plants is reported in our correspondence columns this week by Dr. Scheuer-Karpin, of Hamburg. The incriminated plants, *Chenopodium album* and *Atriplex patula*, are common in England and are not included in our poisonous flora.[2] On the contrary, *C. album*, the commonest of all the goosefoots, was formerly and for a long time used, under the name of "fat hen," as a vegetable by country folk. When fully grown, between June and October, it has a stem about 3 ft. high and clustering spikes of greenish flowers. An equally popular goosefoot, called Good King Henry (*C. bonus-henricus*), was cultivated in gardens, besides being picked wild; the leaves were boiled as a substitute for spinach, and the stem in lieu of asparagus. Apparently no ill results of eating goosefoot have previously been reported either in man or in sheep, which are very fond of it.

Atriplex patula, the spreading halberd-leaved orache, does not seem to have been much eaten in England; but *A. hortensis*, another orache, also known as mountain spinach, which is not a native English plant, is sometimes found growing wild as a garden escape. This plant is cultivated throughout the continent of Europe, where its leaves are used as a substitute for spinach or to correct the acidity of sorrel. The harmlessness of this plant, as generally used, may, however, be due to the fact that people do not eat the roots, which contain more saponins than the stem or leaves. Since the German patients ate the whole plant, they presumably ate the roots, and the saponins, which are strongly hæmolytic, may have been responsible for the jaundice which Dr. Scheuer-Karpin attributes to a high intake of vegetable pigments.

Of the two suspected plants, *A. patula* is more likely to be responsible, especially in view of the atriplicism reported by Kolbert[3] from China. Moreover, the German patients may not have been good botanists and may have incorrectly identified the species, there being enough others both of chenopodium and of atriplex to make confusion possible. Though it seems fairly clear that the vegetables caused the illness, H. M. Sinclair's observations on famine œdema[4] show that this condition is not excluded by normal levels of serum proteins, as Dr. Scheuer-Karpin believed.

REGIONAL ORIGIN OF TUMOURS

Virchow's *Cellular-Pathologie* of 1858 marked the beginning of a new way of looking at the body as "a cell-state in which every cell is a citizen," and of a new study of pathology—cellular pathology. His aphorism, *Omnis cellula e cellula*, indicated that cell growth was not discontinuous—that a new growth of cells presupposed already existing cells. This view was the basis of Virchow's work on tumours (1863–67), which treated these formations as physiologically independent new-growths of cellular structure, resulting from the persistent stimulation of tissue by irritants. Virchow's pupil, Cohnheim, formulated the hypothesis that tumours arise from "cell-rests," or "superfluous groups of cells which during development failed to mature but persisted in the tissues in an embryonic state." This idea was amplified and modified by others, chiefly Ribbert, who added that "groups of cells sequestrated by inflammatory changes were predisposed to tumour formation." It was supposed that these isolated cell groups were released from the normal restraints imposed by surrounding tissues and that this release permitted their indefinite multiplication.

The unicentric views on tumour genesis of Cohnheim and Ribbert, though speculative and erroneous, have strongly influenced pathological thought ever since. Thiersch, Hauser, Lohmer, and others advanced clear evidence for the progressive field origin of tumours and showed the correctness of Thiersch's teaching that recurrence after surgical excision is not always due to incomplete removal but is sometimes the result of fresh cancerous change in predisposed tissue of the region. The final refutation of Cohnheim's thesis was completed by Nicholson and by experimentalists in carcinogenesis; yet the mistaken view that tumours arise unicentrically still persisted in some works of reference on tumour

1. The Aged and the Nation. Liberal Publication Department, 8, Gayfere Street, London, S.W.1. Pp. 72. 2*s*.
2. *Lancet*, 1947, ii, 485.
3. Kolbert, E. R. Lehrbuch der Intoxikationen. Stuttgart, 1906.
4. See *Lancet*, Feb. 28, p. 333.

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pathology,[1] while Ewing[2] concludes that "the great majority of tumour-cells are isolated in origin and throughout their history." In his new and extensive work on the pathology of tumours, Willis,[3] drawing attention to the lingering effects of such old dogmas, urges that modern pathologists should cease to regard them as of more than historical interest. He draws on his rich experience to refute the teaching of several schools that neoplasia arises in an epithelium or tissue at one focus only. "Tumours arise," he writes, "from small or large fields of tissue and enlarge not only by cellular proliferation but also by progressive neoplastic conversion of tissue within those fields. . . . In many cases the extent of the potentially neoplastic field is much greater than the small size of the initially appearing tumour would suggest, a point of great surgical importance." Thus, in the epidermis, "the tumours (squamous cell carcinomata) display plain evidence of a progressive hyperplastic-neoplastic change, still taking place, in a centrifugal direction over fields of epidermis greater in extent than the present sizes of the growths. . . ." In the case of the breast, Cheatle first demonstrated conclusively, in sections of whole breasts, that the primary cancer process transforming epithelial into malignant cells commonly operates on extensive duct surfaces. Nicholson insisted that tumour formation is here multicentric, or rather omnicentric; there seems little doubt that Muir was right in concluding that the neoplastic change is regional rather than focal.

NURSING

AMONG critics of the Working Party's report are some experienced nurses who call themselves the Ten Group,[4] and whose comments are packed with mature thought. They start from the premise that "there is a great need for a statement of the basic requirements of patients as a foundation for the practice as well as the training of nurses." Ward populations in general hospitals have changed in character since the early days of nursing: patients now come to hospital early, often for diagnosis, and many need hardly be "nursed" in the old sense. Hence such factors as adequate nutrition "may be of greater importance to cure than nursing routines, such as bed bathing." The Ten Group see the nurse as part of the team—which includes doctors, surgeons, radiologists, physiotherapists, almoners, and others—engaged in looking after the patient. Primarily, they say, she is an interpreter, who must explain his disorder to the patient, and reassure him and his friends. She is also the hostess who must see "that her guests are at ease, well fed, well housed and happily occupied." She must care for the mental and bodily needs of those entrusted to her, and report accurately on them. As a member of the therapeutic team she must give skilled assistance to the doctor, and meet emergencies until he comes. Finally she must be a health teacher. These qualities and functions, they suggest, are in danger of being lost, and they cannot see in the Working Party's scheme of training any guarantee that fundamental arts and skills will be taught and practised by students.

They conceive of a "nursing group" within the health team. "Nursing" duties (as determined by a survey of patients' needs) should be carried out by nurses having an agreed basic training; but the nursing group will continue to include "numbers of persons, whether called nurses, orderlies or auxiliaries, whose approach is necessarily practical rather than theoretical." The "proper deployment" of members of the nursing group, and especially the wider use of trained nurses for the staffing of hospitals, might well result in "a better and more stable service with a relatively smaller personnel." They press for experiments to determine the best period of training for the professional nurse, to be set up in the regions in association with the surveys of patients' needs, which, they think, should be made by the regional boards. The boards should see that the necessary personnel is there to meet these needs, and the regional nursing committees should "plan their duties so as to give maximum service." In this way, the Ten Group feel, "the nursing profession would assume a responsibility for the nursing needs of the whole country which they have not hitherto shouldered, as the controversy over the care of the chronic sick shows." We should like them to feel similarly responsible for the care of mental patients.

A memorandum from the Royal College of Nursing includes some of the same recommendations—notably that an intensive study should be made of the hours of care required by various types of patients in different types of illness. The college, however, advocates a three-year training period to produce a complete general-trained nurse, and the content of the course, it considers, should be that of the basic course proposed by the Working Party, though there should be considerable experiment into the best ways of correlating theory and practice. The public-health section of the college, together with domiciliary and private nurses, and some of the local branches, recommend a less rigid approach: they would favour a common two-year course in nursing fundamentals, and a third year spent in training in the special field of choice, the whole course culminating in State registration. The public-health section suggest further that the State examination should be divided into two parts, the first to be taken at the end of the second year, and to cover the content of the common course.

PERIODIC DISEASES

MOST doctors can quote examples of periodicity in the symptoms or incidence of disease. Recognised conditions of this kind include menstrual disorders, manic-depressive psychoses, lymphadenoma and leukæmia, hydrarthrosis, purpura, epilepsy and migraine, asthma, colitis, brucellosis, and familial periodic paralysis. Reimann[1] suggests that there is an additional syndrome of periodic disease, with regular though variable episodes of fever and malaise, instances of which have hitherto been regarded as unrelated medical curiosities. He postulates a common underlying cause, discussing 6 patients personally observed, with 22 reported by others. Of the 28 patients, 21 were male. Among Reimann's own cases, 3 were mainly characterised by slight fever and abdominal pain, with exacerbations at intervals of 18, 7, and 28 days, and continuing for 11, 10, and 3 years. The remaining 3 cases were a cyclic neutropenia with malaise and glandular enlargement, occurring every 20–22 days and observed for 2 years; a fortnightly arthralgia observed for 3 years; and a myasthenia recurring every 14–20 days for 2 years.

Possible explanations suggested for these cases include a relationship to endocrine cycles, disorder of a postulated temperature-control mechanism in the reticulo-endothelial system, and manifestations of an epileptic, migrainous, or psychopathic constitution. But Reimann raises substantial objections to every hypothesis yet put forward, and, inferring that there must be some universal undetected physiological cycle in the body, he leaves the question open. He makes one curious and perhaps pertinent observation—that in his cases and those he quotes, and in Ask-Upmark's[2] charts of

1. Mallory, F. B. Principles of Pathologic Histology. Philadelphia and London, 1923. McFarland, J. Surgical Pathology. Philadelphia, 1924.
2. Ewing, J. Neoplastic Diseases. Philadelphia and London, 1940.
3. Pathology of Tumours. By R. A. WILLIS, D.SC., M.D., F.R.C.P. London: Butterworth. 1948. Pp. 992. 63s.
4. Comments submitted to the Ministry of Health. Copies obtainable from H. R. Grubb Ltd., Poplar Walk, Croydon, Surrey. Pp. 8. 6d.

1. Reimann, H. A. *J. Amer. med. Ass.* 1948, **136**, 239.
2. Ask-Upmark, E. *Acta soc. med. suecanæ*, 1938, p. 1.

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352 patients with bone tumours, leukæmias, and anæmias, the periodic exacerbations arise every 7 or multiples of 7 days. He points out, without comment, that solar radiation has a regular periodicity of 6·6 days. He has some distinguished predecessors in this field, although not all have shown such commendable reserve. In a celebrated treatise first published in 1704 Richard Mead [3] quotes cases showing solar or lunar periodicity from Galen, Pitcairne, Arætus, Tyson, Cœlius Aurelianus, Carolus Piso, Hippocrates, Musgrave, Sanctorius, Baglivi, Tulpius, Bartholin, Groenvelt, Van Helmont, Sir John Floyer, Kirckringius, Ramazzini, Ballonius, Diemerbroek, and Sydenham. Hippocrates observed the septenary progression in acute diseases. "And thus far the foundation was good," says Mead,[4] "but when a false theory happened unluckily to be joined to true observations, this did considerably puzzle the affair." Hippocrates's adherence to the Pythagorean philosophy, ascribing a mystic value to the number seven, was soon repudiated by Asclepiades and Celsus. It was Galen, apparently, who first connected the quarterly lunar phases with seven-day "returns and periods of the fevers." It seems that we have not yet exhausted the potentialities of the inductive approach to this historic puzzle.

RISKS OF STERNAL PUNCTURE

AT an inquest at Battersea six months ago the coroner described sternal puncture as "a highly dangerous procedure to obtain pathological material." The published work does not confirm this view, for only two previous fatalities have been reported. Considering the frequency of the operation, which was introduced in 1927 by Arinkin, the mortality is low, though it is possible that some deaths have not been recorded and have not even reached the coroner's court. Often the operation is performed on gravely ill people, so that death might readily be attributed to the disease under investigation. Nevertheless, we can assume that fatalities are extremely rare.

The fatal case reported by Meyer and Halpern [5] was in a man of 51 who had myeloid leukæmia. At the time of the puncture he was extremely apprehensive, for two previous attempts had failed. This time the marrow was found on the second trial, but immediately the needle was removed the patient became faint, dyspnœic, and cyanotic, and he died within a few minutes. A terminal electrocardiogram showed bizarre ventricular complexes indicating severe conduction defects, with progressive bradycardia until asystole was complete. Permission for necropsy was refused. Death was thought to be due to a fatal cardiac inhibitory reflex induced by fear, and it was recommended that a mild sedative should always be given before the operation. In the second case, described by Scherer and Howe,[6] man of 31 with a malignant teratoma of the anterior mediastinum had a similar story of previous unsuccessful attempts, but on this occasion puncture was again unsuccessful. "Shortly afterwards" the patient became pale and semicomatose with dilated pupils and noisy breathing. He died about half an hour after the puncture. Necropsy revealed that the needle had perforated the sternum and pericardium and had entered the anterior wall of the right ventricle to a depth of 5 mm.; there was a large hæmopericardium. In this case the operator, experienced in the difficulties to be met with in the sternums of patients with osteosclerosis, Paget's disease, and sclerosing metastatic tumours, tried at several levels between the third and fourth rib, the needle being inserted sometimes to a depth of $^3/_4$ inch. He was unsuccessful because of the extensive fibrous-tissue replacement of the marrow cells, and the mediastinal tumour may possibly have been pressing the heart on to the under surface of the sternum. Since this accident Scherer and Howe advise, in cases of difficulty, that the needle should be inserted into the sternum in the usual area from below at an angle of 45°, to reduce the danger of deep penetration.

Experience teaches the operator the feel of a normal sternal puncture, and it varies with the age of the subject. In older patients the needle meets with increased resistance and greater care is needed. Some diseased marrows are fibrotic, or perhaps bony hard, while others, as was found in the fatal case last September, are soft and porous. Individual variations in the depth of the sternum are less common than variations in the depth of the parietes, but, whereas the latter can be readily felt, the former can be discerned only through one's sense of touch projected through the needle. Anomalies of the mediastinum and aberrant vessels are not likely to be encountered. All the same, as with every procedure and treatment which carries any risk whatever, sternal puncture should not be done unless the full indications are present. A sternal puncture is justified in any case of refractory or obscure anæmia, atypical leukæmia, and "storage" disease, and in some protozoal diseases (systemic leishmaniasis and malaria, especially malignant tertian). It is doubtful if it can often be justified for medulloculture, though Ling and Hsueh [7] suggest that it should be more widely used in systemic bacterial infections, especially when blood-culture is unsuccessful. Scherer and Howe, on the facts before them, were inclined to attribute Meyer and Halpern's fatality, like their own, to cardiac tamponade; and they may be right. Nevertheless, we must reckon with the fact that sudden collapse and death due to reflex cardiac inhibition is a possible sequela of sternal puncture. Nor should the risk of infection be overlooked, for it is met with from time to time when medullo-infusions are given. Finally, it should be remembered that some of the diseases which call for diagnostic sternal puncture may be associated with a bleeding tendency, so that relatively trivial sternal trauma, which might be expected to heal without difficulty, may lead to a fatal hæmorrhage.

ORIGINS OF SOCIAL MEDICINE

IN a historical survey Rosen [8] says that though in the 18th century a number of medical men appreciated the need for social viewpoints, the first clear exposition of social medicine came from Germany in connexion with the medical reform movement during the revolution of 1848. Led by Rudolf Virchow and Salomon Neumann, German physicians joined forces to insist, in Neumann's words, that "medical science is intrinsically and essentially a *social* science, and as long as this is not recognised in practice we shall not be able to enjoy its benefits and shall have to be satisfied with an empty shell and a sham." With the defeat of the revolution, however, the medical reform movement came to a quick end. In Britain at this time liberal theory had emerged as a doctrine of economic laissez-faire; protests against the ill effects of economic liberalism on the lives of men went almost unanswered, and it was not until the latter part of the century "that the gradual and peripheral erosion which had been carried on in practice began to receive conceptual recognition." Long before then unsavoury facts had intruded themselves into public consciousness. Thus in 1832 Kay published his study of the *Moral and Physical Condition of the Working Classes Employed in the Cotton Manufacture in Manchester*; among the workers he found illness, poverty, vice, and physical degradation all intimately interlocked. But, as Rosen points out, Kay was permeated with the bleak gospel of economic orthodoxy, and it was left to others to recognise the essential relationship between social and economic institutions and the health of factory

3. Mead, R. De Imperio Solis ac Lunæ in Corpore Humana, et Morbis inde oriundus. London, 1704. English translation, London, 1712.
4. Mead, R. Medical Works. Dublin, 1767.
5. Meyer, L. M., Halpern, J. *Amer. J. clin. Path.* 1944, **14**, 247.
6. Scherer, J. H., Howe, J. S. *J. Lab. clin. Med.* 1945, **30**, 450.
7. Ling, C.-C., Hsueh, P.-C. *Chin. med. J.* 1947, **65**, 339.
8. Rosen, G. *Milbank mem. Fd Quart.* 1948, **26**, 7.

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workers. In the previous year, 1831, Thackrah had produced his pioneer treatise on occupational medicine, in which he supported the struggle to restrict child labour; in 1842 Chadwick's *Inquiry into the Sanitary Condition of the Labouring Population of Great Britain* was issued; and this was followed in 1844 by the report of the Health of Towns Commission. Opinion was on the move, and though twenty years later economic liberalism was still the dominant social philosophy, it was gradually being recognised as untenable for an industrial society. In 1870 the Poor Law Board seriously considered a system of free medical advice for all wage-earners.

Meanwhile, Rosen recalls, a well-developed system of social medicine had been presented, in 1865, by Meynne, a Belgian army doctor, in his *Topographie Médicale de la Belgique*. In Germany the movement of 1848 now seemed very distant; and the advent of bacteriology made it all too easy to equate organisms and disease in the relationship of cause and effect. But at the very time that Emil Behring was proclaiming bacteriology as the ultimate medical truth and Koch as its prophet, a young German medical student, Alfred Grotjahn, produced a concept of social medicine which in Rosen's opinion initiated the theoretical advances of the 20th century. Grotjahn pressed for health education; he saw that the medical curriculum would have to include social hygiene; and he urged that use should be made of the methods of statistics, demography, anthropology, economics, and sociology, as well as those of medicine proper. The absence, in Britain and the United States, of any concerted attempt, until recently, to organise and apply the concept of social medicine, Rosen attributes to the leading rôle taken by laboratory sciences, to the rise of specialism, and to a limited view of public health in both countries. In the last few decades, however, the development of such branches as endocrinology, nutrition, and psychiatry have helped to break down compartmental thinking; while in society as a whole the ideology of complacent individualism has worn thin.

A TRANSFIXIONIST

A FEW months ago a Peripatetic Correspondent[1] described a film of an invulnerable man, included in the week's news-reel. It was taken at the University Hospital at Zürich, where the subject, Mirin Dajo, gave an exhibition of his powers. It showed him being transfixed by a sword, without apparent inconvenience. Further accounts of this man have since been published.

The son of a butcher, Mirin Dajo is in the thirties, thin and ascetic-looking. He claims that he has supernatural powers, making him invulnerable to wounds and to poisons, that he derives his power from God, and that his mission is to found a Universal Brotherhood for Peace. By his followers, who seem to be in considerable numbers, he is regarded as a mystic, though mystics usually frown on severe physical mortification or the exercise of psychic powers. In the film a long instrument was thrust through him from behind, entering below the right ribs and emerging from under the costal margin of the same side in front, apparently piercing the right lobe of the liver. The second piercing was done from the left side in the midaxillary line, the point of the weapon appearing on the right side about the same level in the anterior axillary line; this time the instrument apparently passed in front of the spleen, pushing the stomach aside or piercing it, continuing in front of the aorta and vena cava below the portal fissure and through the lower part of the right lobe of the liver. On withdrawal of the instrument no bleeding was seen, though the operator pinched the sides of the skin wound together. There appeared to be no pain attached to the operation, except a little when the point of the weapon entered or emerged from the skin. There were a large number of pigmented scars in the entrance and emergence areas. This extraordinary film was so alarming to the general public that it was recalled in a few days. Mirin Dajo claims that he has been transfixed 500 times and that his heart has also been pierced. In the film the weapon certainly did not go near the heart, and on one occasion when his heart was supposed to have been transfixed a photograph was taken which shows three hollow-pointed rods pushed through his body from behind forwards well away from the cardiac region. No aseptic precautions are taken—in fact the operator drags the instrument through his hands before thrusting it through Dajo's body. The weapons usually used are like giant sewing needles which taper slightly from about 8 mm. in diameter at the thick end. Their surface is smooth and they have no cutting edges, only the points being sharp.

Stimulated by Dajo's feats, Bessemans[2] has studied transfixion experimentally. He pierced the abdomen and the thorax, including the heart, of rabbits, guineapigs, and white mice with needles, in one case putting seven needles through a rabbit's abdomen. After leaving them in position for five to ten minutes he withdrew the needles, and according to Bessemans the animals were unharmed. They behaved just like normal animals except that the mice sometimes went off their food for 48 hours. Neither did the animals seem to feel any pain except when the instrument went through the skin. Necropsies showed that the needles had pierced the hollow organs of the abdomen and the heart, but the small apertures had sealed themselves. Infection never occurred, although the instruments were not sterilised. Bessemans later repeated the experiments on dogs with similar results.

There is no reason to think that conditions are very different in man. Many men have recovered spontaneously from rifle-bullet wounds where the missiles have traversed the abdomen; and when rods have accidentally pierced the abdomen, and been withdrawn, patients have recovered without medical assistance. Moreover, as those who treat perforated peptic ulcers conservatively know well, many of these perforations become sealed off, although conditions here, with diseased tissue, are extremely unfavourable. So perhaps after all there is nothing miraculous in this feat of Dajo's. Nevertheless, if he continues to practise these bodily austerities it seems likely that one day a large vessel, such as the vena cava, which has been fixed by fibrosis resulting from previous experiments, will be pierced, and then he will die from hæmorrhage; or possibly the organisms which are usually wiped off the weapon as it passes through the abdominal wall will be too numerous for this to happen and then he will die from septic peritonitis. In short, his is a dangerous accomplishment.

1. See *Lancet*, 1947, ii, 523.

F.R.C.S.E.

HITHERTO candidates for fellowship of the Royal College of Surgeons of Edinburgh have sat a single examination. Now, however, the examination is to be divided into two parts. The first part will be on anatomy and physiology and on pathology and bacteriology, while the second will be on the principles and practice of surgery and on one subject to be chosen by the candidate from the following: (1) surgical pathology and operative surgery, (2) laryngology, otology, and rhinology, (3) obstetrics and gynæcology, or (4) ophthalmology. The new regulations come into force at the beginning of next year; but unsuccessful candidates who appeared for examination on or before March 15 this year will still be able to opt for examination under the existing regulations.

2. Bessemans, A. *Brux.-méd.* 1948, **28**, 584.

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Special Articles

ANÆMIAS *

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THE old time-honoured view of maturation of the red cell presupposed that the megaloblast was the normal physiological precursor of the normoblast. Every normocyte was once a megaloblast—one stage in the maturation from the hæmocytoblast to the megaloblast, erythroblast, normoblast, reticulocyte, and normocyte. If the anti-pernicious-anæmia principle of liver was not adequately supplied, there was a tangential development of the megaloblast to a megalocyte. This ceased, and development became vertical into a normoblast only on adequate supply of the anti-anæmic liver principle.

This conception was derived from Sabin's classical work on the development of the red cell on the chick embryo, translated without question to the human being. As sternal-marrow puncture came into common vogue, our ideas of maturation of the red cell have undergone a fundamental change. This centres on the concept of the megaloblast as a pathological red cell, instead of as a physiological precursor of the normoblast. The megaloblast is a pathological red cell which results from denial to the bone-marrow of the liver principle and is, according to most authorities, incapable of transformation into the normoblast. On supply of liver principle the megaloblast is no longer formed, but its precursor, very appropriately called the pro-erythroblast by Israëls (1939, 1941), matures into the normal normoblast. The megaloblast which has already been formed keeps up its abnormal and parallel development through stages A, B, and C—early (basophilic), intermediate (polychromasic), and late (eosinophilic) respectively—to a megalocyte.

Under long-continued stress and profound strain on the bone-marrow, even on supply of abundant liver principle, the pro-erythroblast undergoes an abnormal, and again parallel, pseudo-megaloblastic development into a macronormoblast (called a macroblast for short), which can only grow into a macronormocyte (or macrocyte). Endless confusion reigns today for want of adequate appreciation of this third parallel development of the human red cell. Generally speaking, the macrocyte seen in the peripheral blood is round; the megalocyte is oval. This differentiation was noted by Davidson and Gulland (1930), who, however, did not follow it up to its logical conclusion. The macroblast only superficially resembles the megaloblast in appearance, chiefly in size. One differs from the other essentially in nuclear structure and framework. The macroblast is a magnified abnormal edition of a normoblast, whereas the megaloblast is a pathological distortion of the normoblast.

Israëls's pro-erythroblast is a generic name for the common precursor of all erythroblasts, normal (normoblast), abnormal (macroblast), and pathological (megaloblast), and seems eminently suitable for general adoption. The old erythroblast was a specific intermediate cell between a megaloblast and a normoblast. The pro-erythroblast is something which stands for, or is ahead of, an erythroblast. The pro-erythroblast is a common progenitor of an erythroblast, and is itself the descendant of the primitive hæmocytoblast.

This comparatively simplified view is not universally accepted. Its chief sponsors in the English-speaking world are Dameshek and Valentine, Israëls (1939, 1941), and Jones (1943), following Naegeli and Ferrata of the Ehrlich school. It has not yet got into textbooks, barring perhaps the latest edition of Whitby and Britton (1946), though it has been well noted (*Lancet* 1942, 1943). Orthodox teaching does not yet recognise it, though it is compelled to admit that a megaloblast has never been found in the normal human bone-marrow (private communication from Dr. D. Govinda Reddy, professor of pathology, Madras Medical College).

One cause of delay in ready acceptance of the new view is confusion between the pro-erythroblast and the megaloblast. (I myself have been a victim of it.) The pro-erythroblast has nucleoli, whereas the megaloblast has not.

CLASSIFICATION OF ANÆMIAS

It must today be obvious that a correct classification of anæmias must ultimately be based on study of the sternal marrow. All previous work on anæmias must be reviewed in the light of the knowledge we have gained from the sternal marrow. The main classification must therefore be into (1) megaloblastic, (2) macroblastic, (3) normoblastic, and (4) hypoplastic and aplastic. I have fully discussed this matter in my Maharaja of Travancore Endowment lectures on clinical medicine, 1943–44, delivered under the auspicies of the University of Madras (1944). I have essentially followed Israëls.

A megaloblastic anæmia may arise from any of four causes: deficient supply of food or extrinsic factor; deficient secretion of gastric or intrinsic factor; deficient absorption of the erythrocyte maturation factor (E.M.F.) which results from the interaction of the extrinsic and intrinsic factors; and defective utilisation of the E.M.F. from known and unknown causes (achrestic anæmias). I have omitted defective storage as a cause, for no case of hepatic cirrhosis seems yet to have been reported in which the sternal marrow has been found megaloblastic. Anæmias with indices of over unity found in cirrhosis of liver are presumably macroblastic, from depression of the bone-marrow.

Normoblastic anæmias may similarly arise from deficiency of iron in food, defective absorption, defective utilisation, or excessive blood-loss. Deficiency of iron in food, however, rarely operates in adults, except in women in the childbearing period, for apparently, when once growth ceases, iron requirements are so small as not to exceed the minimum supply of it, except when there is blood-loss, patent or latent.

Macroblastic anæmias are generally due to excessive hæmolysis and long-continued and profound strain on the marrow from any cause.

Hypoplasia and aplasia may arise from various degrees of failure of erythropoiesis, primary or secondary.

A proper appreciation of the essential soundness of this classification leads to scientific therapy and avoids gross wastage of drugs, especially of liver. Megaloblastic anæmias need liver or other source of E.M.F.; macroblastic anæmias will not respond to liver, their effective treatment must be ætiological and may call for blood-transfusion; normoblastic anæmias require iron in adequate dosage and probably blood-transfusion.

It is impossible and unnecessary to do a sternal puncture in every case of anæmia for treatment to be effective. Correlation of sternal-marrow changes with alterations in the peripheral blood suggests that a hypochromic microcytic anæmia is always normoblastic. Only one case of such an anæmia in association with a megaloblastic marrow seems to have been reported (Foy and Kondi 1943). It is only when the colour-index and/or the volume index are greater than 1 that the question may arise of the anæmia being megaloblastic or macroblastic. It is very necessary to solve this question if treatment is to be specific and effective. Apart from Davidson and Gulland's (1930) earlier observation on the degree of anisocytosis and poikilocytosis being well marked in megaloblastic anæmia, one cannot but do a

* Résumé of a contribution to the second annual conference of the Association of Physicians of India at New Delhi on Feb. 15, 1947.

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sternal puncture for accurate diagnosis. It may be that in some cases of megaloblastic anæmia there are present other manifestations due to, or associated with, defect of the E.M.F., such as glossitis, diarrhœa, &c.

Where a diagnostic sternal puncture has not been done, a megaloblastic anæmia may be called megalocytic, and a macroblastic anæmia macrocytic. It seems very desirable to recognise this fundamental ætiological difference between a megalocytic and a macrocytic anæmia. Today all such anæmias are indiscriminately called megalocytic or macrocytic, thus leading to hopeless confusion and perpetuation of diagnostic errors and to needless non-specific therapy. A general acceptance by hæmatologists all over the world of this new nomenclature will at once clarify many controversial issues.

CRUDE AND REFINED LIVER EXTRACT IN MEGALOCYTIC ANÆMIAS

Wills et al. (1937) and Wills and Evans (1938) were the first to report on the inefficacy of refined liver extracts in the treatment of tropical megalocytic anæmias. Napier (1938, 1939) confirmed their results. They accordingly postulated that the anti-anæmic principle effective against tropical anæmia and present in crude extract was lost in the process of refinement, and that it differed from the E.M.F. potent in addisonian pernicious anæmia, and therefore from Castle's extrinsic factor. They seemed to get confirmation in experimental macrocytic anæmia of monkeys (Wills and Bilimoria 1932, Wills 1934). Foy and Kondi (1939) were the first to strike a discordant note. They found that 'Anahæmin' and like extracts were quite effective against tropical megalocytic anæmia of Macedonia at any rate. I (Sundaram 1944) found too that refinement of liver extracts did not affect their potency against megalocytic anæmias even in South India.

Even so, the impression persists in the hæmatological literature that refined liver extracts are no good against megalocytic anæmias other than addisonian pernicious anæmia. I think that, apart from the influence of Wills's and Napier's reputations, there are two reasons for the persistence of this fallacy. I myself did not realise till 1940 that refinement seems to introduce a lag factor in the hæmopoietic action of liver extracts. When I made allowance for delayed action, I found quite good results with a standard dose of 12 ml. of anahæmin and like extracts in tropical megalocytic anæmia with or without diarrhœa and even in sprue. Secondly, Wills's and Napier's observations were made before sternal puncture became the essential basis of differential diagnosis, and must be reviewed in the light of our newer knowledge. This should include recognition of the megaloblast as a singular pathological red cell and its structural differentiation from its parent (in common with the macroblast and normoblast), the pro-erythroblast, with its nucleoli. Many of Wills's and Napier's megalocytic anæmias (whether called macrocytic or megalocytic) were probably macrocytic anæmias in reality. For all we know, there may be present in crude and proteolysed liver extracts a factor or factors similar to, if not identical with, folic acid which are very useful in the treatment of macrocytic and refractory megalocytic anæmias. I have so far treated a dozen cases of megaloblastic anæmia with folic acid, natural as well as synthetic (Lederle's). The results are indeed very happy.

It is thus not a question of refined or crude liver extract, but one of good or bad make, that counts in the effective treatment of tropical or nutritional megalocytic anæmia, as in other kinds of megalocytic anæmia, including addisonian pernicious anæmia. A good liver extract, even though refined, is therapeutically effective against not only the hæmatological but also the lingual and gastro-intestinal manifestations of sprue (Sundaram 1944).

USE AND ABUSE OF LIVER EXTRACTS

The anti-anæmic effect of liver extract is specific and quantitative, even as that of iron. Use of liver extract in other than a megalocytic anæmia is non-specific and unscientific. Liver extract may have other side-effects, of an exhilarating character, and may give rise to a remarkable sense of well-being. But these do not help in the restoration of hæmoglobin or rise of red-cell count, unless there is a deficiency of liver principle, manifested by a proportionate megaloblastic reversion of red-cell maturation. It may be, too, that liver extract may promote effective absorption of hæmopoietic principles in general. But these actions are neither specific nor quantitative, as they are in megalocytic anæmia.

One of the most abused drugs in the treatment of any anæmia is undoubtedly liver extract. Generally speaking, iron-deficiency anæmia is far commoner. Iron is thus the more commonly indicated drug in anæmia, especially when there is no symptom other than what may be directly due to tissue anoxia. Megalocytic anæmia is generally associated with symptoms of associated deficiency, such as glossitis and diarrhœa. In general practice, therefore, where no investigation may be possible, it would be more to the point to give iron, in adequate dosage and in appropriate form, than to give liver extract straight away.

Iron is almost a physiological necessity in infancy and childhood and in women in their childbearing period—in infancy because the diet after weaning does not usually contain adequate iron; in older children because the iron supply does not ordinarily keep pace with the demands of growth; and in women because of either monthly losses of blood or extra demands made by the fœtus or suckling child. A primary dietetic deficiency of iron should not be postulated in adult males, unless every conceivable cause of excessive blood-loss or blood destruction or inhibition of the bone-marrow is meticulously excluded.

REFERENCES

Davidson, L. S. P., Gulland, G. L. (1930) Pernicious Anæmia. London.
Foy, H., Kondi, A. (1939) *Lancet*, ii, 360.
— — (1943) *Ibid*, ii, 505.
Israëls, M. C. G. (1939) *J. Path. Bact.* 49, 231.
— (1941) *Lancet*, ii, 207.
Jones, O. P. (1943) *Arch. Path.* 35, 752.
Lancet (1942) i, 358.
— (1943) ii, 576.
Napier, L. E. (1938) *Lancet*, ii, 106.
— (1939) *Indian med. Gaz.* 74, 1.
Sundaram, S. K. (1944) *Antiseptic*, 41, 269, 337; *Indian med. Gaz.* 79, 253.
Whitby, L., Britton, C. J. C. (1946) Disorders of the Blood. London.
Wills, L. (1934) *Indian J. med. Res.* 21, 669.
— Bilimoria, H. S. (1932) *Ibid*, 20, 391.
— Clutterbuck, P. W., Evans, B. D. F. (1937) *Lancet*, i, 311.
— Evans, B. D. F. (1938) *Ibid*, ii, 416.

NATIONAL HEALTH SERVICE

SERVICE COMMITTEES AND TRIBUNAL

REGULATIONS for general practice were reviewed in our last issue; and this week we summarise regulations governing service committees and tribunal (Statutory Instruments, 1948, no. 507).

SERVICE COMMITTEES

Should a complaint be brought against a doctor or dentist or chemist in respect of an alleged failure to comply with the terms of service under the Act it will ordinarily be investigated by the appropriate service committee—in the case of a doctor the medical, of a dentist the dental, and of a chemist the pharmaceutical service committee. Should the complaint concern members of more than one of these three professions it will be dealt with by a joint services committee.

Membership.—The medical, dental, and pharmaceutical service committees are each formed of a

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chairman, 3 lay members of the executive council, and 3 professional members appointed by the appropriate professional committee (in the case of the doctors by the local medical committee). An equal number of deputies is also to be appointed, each of whom is entitled to take the place of an absent member. The joint services committee has a chairman, 2 lay, 2 medical, 2 dental, and 2 pharmaceutical members. The professional members are chosen by the appropriate service committee from among their professional members or deputies. The respective professional members will be called to a meeting of the joint services committee only if the hearing involves a question relating to a member of their particular profession.

Choice of chairman.—Each service committee meets to choose its own chairman, who may be any one of the lay members of the executive council. If the committee fails to agree or if, within seven days after the meeting either the lay members or the professional members inform the council that they find the suggested chairman unacceptable, the council appoints a new chairman. If this new chairman in turn is found unacceptable to lay or to professional groups, a chairman may be appointed by the Minister, after consultation with the council and the appropriate local professional committee. The chairman chosen by the council or the Minister need not be from among members of the executive council. He may not be a medical or dental practitioner, or a pharmacist. A deputy chairman is chosen in the same way as the chairman. If either chairman or deputy chairman happens to be a member of the committee, he ceases to be a member (except in his capacity as chairman or deputy chairman), and a new member is appointed to take his place.

Time prescribed for bringing a complaint.—Written notice of a complaint against a medical practitioner which it is desired shall be investigated shall be given within six weeks of the event which gave rise to the complaint. This period may exceptionally (if good reason is given, and if the Minister gives consent) be extended to two months.

Proceedings of service committees.—The proceedings are to be held in private. Either party to the complaint may be assisted in the presentation of his case by some other person, but must not employ counsel, solicitor, or other paid advocate to conduct his case. The rules of procedure of the committee (dealing with the receipt of the complainant's statement and the respondent's reply, the summoning of the meeting, the circulation of the complaint and reply, the procedure in committee, &c.) follow closely those already familiar under National Health Insurance procedure.

LOCAL EXECUTIVE COUNCIL

The committee reports its findings to the council, stating the facts considered established and the inferences that may properly be drawn from these facts, together with a recommendation as to the action, if any, which they consider should be taken. The executive council decides what shall be done, and this may include action in one or more of the following ways:

1. If they consider that the cause of the complaint arose from the doctor being unable to give adequate attention to the patients on his list, they may impose a special limit on the numbers to be allowed on his list.

2. They may recover from the doctor (by deduction from his remuneration or otherwise) and pay to the patient any expenses incurred by the patient through failure of the doctor to comply with his terms of service.

3. They may represent to the Minister that a sum shall be withheld from his remuneration.

4. They may represent to the tribunal that the continued inclusion of this medical practitioner on the medical list would be prejudicial to the medical services.

Appeals against the council's decision.—An appeal can be made to the Minister against any of these decisions, except the last one (where the council places the case before the tribunal). Notice of appeal must be given within a month of the council's decision being notified. An oral hearing of the appeal will ordinarily be held unless the appellant does not require such a hearing. The appeal is heard by not more than 3 persons. They are appointed by the Minister, and one of them must be a medical practitioner selected from a panel of practitioners nominated by a body, which is, in the Minister's opinion, representative of practitioners engaged in the provision of general medical services. Any party to an appeal may be represented at the oral hearing by counsel or solicitor. Before directing the council to withhold remuneration from a practitioner, the Minister refers the case for advice to a medical advisory committee consisting of the chief medical officer of the Ministry of Health (who is chairman), 2 other medical practitioners in the service of the Ministry, and 3 medical practitioners chosen from the panel mentioned above.

INVESTIGATION OF COMPLAINTS

Excessive prescribing.—Where it appears that there has been excessive prescribing, the Minister may refer the matter to the local medical committee for their consideration.

Certification.—Where it appears that the practitioner has failed to exercise reasonable care in the issue of certificates, the Minister may refer this also to the local medical committee for their consideration.

Record keeping.—Failure of the practitioner to carry out his obligations in regard to record keeping is again a matter that the Minister may refer for consideration to the local medical committee. In all these cases the local medical committee will report their findings to the Minister together with a recommendation of the action, if any, which should be taken. The practitioner may (within one month) appeal against the committee's decision. If he does so, his appeal is heard by not more than 3 persons (not being officers of the Ministry of Health) of whom 1 at least shall be a medical practitioner.

Fee charging.—If any question arises as to whether any treatment given by a medical practitioner to a patient is, or is not, treatment for which the practitioner may accept a fee, the question shall be referred to the local medical committee for decision. This committee will also decide on any question of whether any substance supplied to a patient was a drug forming part of the pharmaceutical services provided under the Act.

Complaints between practitioners.—The local medical committee shall have power to consider any complaint made to them by any medical practitioner against a medical practitioner (practising in the committee's area) involving any question of the efficiency of the general medical services.

THE TRIBUNAL

The tribunal considers only cases where representations have been made that the continued inclusion of a practitioner on the medical list would be prejudicial to the efficiency of the medical services. Ordinarily, such a complaint would be put forward only by an executive council after preliminary investigation by its medical service committee. If a council does make such representation the tribunal must hold an inquiry. If any other body, or individual, makes a complaint, the tribunal may ask for a preliminary statement of the grounds for complaint, and may require this statement to be verified by statutory declaration. If it appears to the tribunal, after considering the statement, that no good cause has been shown why an inquiry should be held, they may refuse an inquiry.

Inquiry before the tribunal.—Due notice must be given of the complaint to the respondent, and he is entitled to

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inspect, and to apply for copies of, any documents sent by the complainant to the tribunal. The inquiry shall be *in camera* unless the respondent has applied for a public inquiry. Both complainant and respondent may employ counsel or solicitor. The tribunal can subpœna witnesses.

Appeal to the Minister.—When the inquiry is complete the tribunal reports its findings to the Minister, to the complainant, and to the respondent. The respondent (but not the complainant) has the right to appeal to the Minister against the tribunal's findings. The appeal must ordinarily be made within two weeks. It will be heard by a person appointed by the Minister, and this person shall be assisted by one of the practitioners whose names appear on the panel nominated by practitioners' representatives.

PROVINCIAL TEACHING HOSPITALS

THE Minister of Health has issued an Order [1] designating a teaching hospital in each of the ten university medical centres outside London, as follows:

Newcastle-upon-Tyne.—Royal Victoria Infirmary (including Castle Hill Convalescent Home, Wylam-on-Tyne); Princess Mary Maternity Hospital; Babies' Hospital; Dental Hospital.

Leeds.—General Infirmary (including Ida and Robert Arthington Branch Hospital, Cookridge, and Roundhay Hall Annexe, but excluding Castleford, Normanton, and District Branch Hospital, Castleford); Maternity Hospital; Hospital for Women; University Dental Hospital.

Sheffield.—Royal Infirmary and Hospital (including Royal Hospital and Fulwood Annexe, Royal Infirmary, and Edgar Allen Institute); Jessop Hospital for Women (including Firth Auxiliary Hospital); Children's Hospital (including Children's Hospital Annexe).

Cambridge.—Addenbrooke's Hospital (including Addenbrooke's Home of Recovery and Charlotte Rebecca Waley Home of Rest for Nurses, Hunstanton); County Hospital; Borough Isolation Hospital.

Oxford.—Radcliffe Infirmary (including Sunnyside Recovery Home and Osler Pavilion, but excluding Didcot and District Hospital); Churchill Hospital; Eye Hospital; Cowley Road Hospital; City Isolation Hospital (including Old Isolation Hospital and Garsington Smallpox Hospital).

Bristol.—Royal Hospital (including Royal Infirmary, General Hospital, and Cerne Abbas Convalescent Home, Bournemouth); Maternity Hospital; Royal Hospital for Sick Children and Women (including Jan Smuts Convalescent Home, Burnham-on-Sea); Eye Hospital; Queen Victoria Jubilee Convalescent Home.

Cardiff.—Royal Infirmary (including William Nicholls Convalescent Home, St. Mellons, Mon); Llandough Hospital; Lord Pontypridd Hospital.

Birmingham.—United Hospital (including General Hospital, Queen Elizabeth Hospital, and Jaffray Branch Hospital); Children's Hospital (including St. Cuthbert's Hospital, Malvern); Midland Nerve Hospital; Dental Hospital; Birmingham and Midlands Hospitals for Women (including Hospital for Women, Maternity Hospital, Women's Convalescent Home, Sparkhill, and Gertrude Myers Home, Evesham).

Manchester.—Royal Infirmary (including Central Branch, Private Patients' Home, and Barnes Hospital, Cheadle); St. Mary's Hospitals for Women and Children (including St. Mary's Maternity Hospital); Royal Eye Hospital; Dental Hospital; Foot Hospital.

Liverpool.—Royal United Hospital (including Royal Infirmary, David Lewis Northern Hospital, Royal Southern Hospital, and Stanley Hospital); Women's Hospital (including Hospital for Women, Shaw Street, and Samaritan Hospital for Women); Maternity Hospital (including Hesketh Annexe, Southport); Royal Children's Hospital (including City Branch, Heswall Branch, and Thingwall Branch, Birkenhead); Eye, Ear, and Throat Infirmary; St. Paul's Eye Hospital; Dental Hospital; Convalescent Home, Woolton.

For administrative purposes each group is to be known as "the United Hospitals"—for example, "the United Newcastle-upon-Tyne Hospitals." An Order, on similar lines, for the Metropolitan area is to be made shortly.

1. National Health Service (Designation of Teaching Hospital (no. 1)) Order, 1948. H.M. Stationery Office. 1*d*.

In England Now

A Running Commentary by Peripatetic Correspondents

SOMEONE said that district nursing is concerned only with the chronic sick and if divorced from midwifery would be intolerably boring. Remembering the days when I struggled round a large rural practice and took all the temperatures, dressed the wounds, gave the injections, and replaced the elastic-plaster bandages unaided, I could not believe this. If there is not more than enough work in any general practice to keep the nurse busy I am a Dutchman. After all on July 5 next, when we are all on the panel, there will be no financial advantage to the doctor in doing a nurse's work; and midwifery undoubtedly demands the whole thought, enthusiasm, and time of the women who profess it. Then someone else said, "Well, you don't want to send two different people to the same house when one could do both jobs," and would not be quieted when I replied that if you had a toothache and a pain in the belly you didn't expect one person to deal with both, so why should one person deliver the baby and also dress the old gentleman with a discharging sinus? Anyway, how often did such events occur together in one house? In the end it became clear that I must go up into the Fells and see for myself.

Half a mile out of the village, a lane, macadamised but only wide enough for a single car or cart, leads up into the Fells and after a further half-mile reaches a farm, where the macadam ends. When I arrived, Mrs. S was brushing the steps of the farm house. "Good morning," I said, "I am the doctor in charge of the health services in this county" (it seemed better to appear as important as possible) "and I am inquiring into the work of our district nurses" (they are not ours, as a matter of fact, until July, but a farmer's wife, deep in the hill country, would hardly know that). "Does nurse ever visit you?" "Oh yes, she came when my father was ill all through the snows of last winter and we had to be dug out three times. The doctors and nurses have a rough time in these parts. The nurse used to come every other day. Two very good girls we have now." So far so good and I continued on through the farmyard to embark on the path leading through the hills.

In half a mile more I reached another farm and again explained myself to the farmer I met in the yard. "Come in, Sir," he said, "and talk to the wife; she knows more about these things than I do." Mrs. B seated me by the kitchen range, which very sensibly was in the front living-room, and explained that they paid 2*d*. a week for the ambulance but had never paid into the nursing association. Her husband had been ill for a month two years before with bronchitis and asthma. "The doctor came every day," Mrs. B said, "and gave him an injection in the arm and another in the thick of the buttock. The relief was wonderful. Doctor wanted me to give the injections but I never could summon up enough courage. After all, if you aren't trained for the job you never know what you are going into." I asked if she never thought the district nurse might have come. "I never thought of it," she replied. "We have always relied on the doctor and he has a motor-bike for reaching isolated farms. I was ill myself five years ago and had to go into hospital for an appendix operation. Dr. T came up in the middle of the night and hit on the trouble right away. Two years later I was ill again for a fortnight with adhesions before going in for another operation." "Who nursed you when you were in bed?" I asked. "Oh, we managed," was the reply, "and the doctor came nearly every day. We have never had the nurse except when my two children were born."

Farmer B escorted me along the path, because "with them shoes you need to find a dry route," and told me that a mile or so farther on I would come to a little cottage where an old lady lived alone since the old man she kept house for died. The old lady greeted me politely. No, she never wanted the nurse. "Dr. T always comes to see me if I want him and when the old man was alive doctor used to come regularly." "Has the nurse never been to your house then?" I asked. "No, Sir, not in the twenty years since I began to keep house here."

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At the next farm the story was much the same. Nurse came to deliver the baby and made occasional visits in the first months; otherwise she was called in only when there was an aged person with a protracted or incurable illness. But nursing, of the kind we were familiar with at hospital, appeared to be unknown. As I wended my way back along the river bank, its babbling waters joined with my scurrying thoughts. Is district nursing impracticable and unwanted up here? Or after July 5 shall we see doctor and nurse acting at last as a team, with the nurse doing the nursing and the doctor having enough time for his doctoring?

* * *

A recent journey to London gave me the chance to verify a principle of which I may perhaps claim to be the first discoverer; I refer, of course, to the Interavailability of Toilet Soaps. As with Einstein (*magnis componere parva*) this important discovery did not burst on me fully armed but appeared first in the comprehensible guise of a special case. It was some five years ago that my memory, or rather its lack, first enabled me to observe that forgetting toothpaste was made a trivial misfortune by the fortunate chance that teeth could be brushed effectively, if less pleasantly, with ordinary soap. Since then, the pattern has become filled in and I have proved empirically that shaving soap will serve as toothpaste and ordinary soap, while ordinary soap can be shaved with and also applied to the teeth. My experiences with toothpaste as a substitute for other soaps have been less extensive, partly because of the relative inaccessibility of this material but also because I seldom remember toothpaste and forget all else.

Like many other of the principles which we wrest from nature, the mutual aid of soaps has its limitations. The more severe instances of forgetfulness, like that from which I suffered recently, involve materials other than soap; and it may as well be stated bluntly that no known form of soap can replace a razor or toothbrush. Then, the soap itself must be of reasonable standard—I recall a bar of "shaving soap" bought in an Arakan bazaar which effervesced violently on contact with water, forming a pseudo-lather which lasted for about five seconds. Such a soap would obviously have been comfortless on the skin and almost dangerous in the mouth. Allowing for such limitations, however, we can still commend a bold policy in interchange of soaps to those whose weekends may be otherwise made miserable by their forgetfulness.

* * *

Last night my first patient was a proud mother bringing in her boy, aged 11, a typical Fröhlich's. "He's found another nut," she said. "Oh, when did he do that?" I asked, playing for time and wondering what she meant. "Last night, when he was having a bath. He gave such a shout that my husband rushed in to see what had happened, and he found it too. Will you please see if it is all right?" I was glad to confirm that the missing testicle had at last descended, and the proud mother went out happy.

* * *

Boarding a bus the other evening the conductor looked me inquiringly in the eye and the following conversation took place.

Con.: "Haven't I seen you somewhere before, Sir?"
Self: "Have you?"
Con.: "Coldstream Guards?"
Self: "Lock Hospital?"
Con.: "Should have kept my blooming trap shut."

* * *

What constitutes a low-protein diet? One of the American journals describes it as "not more than one egg, two ounces of meat and a pint of milk per day." Which makes me wonder whether the phrase commonly used in case-histories, "nothing in chest or abdomen," came in at the same time as rationing.

* * *

"It's a real shame," an old dear of 84 told me, "first it's the mines, then it's the railways, and now it's the 'orspitals. It makes me real mad, it does, to think the Government's going to neutralise all you nice doctors."

Letters to the Editor

R.A.M.C. JUBILEE

SIR,—On June 23 this year the Royal Army Medical Corps will celebrate its golden jubilee.

Her Majesty the Queen, our Colonel-in-Chief, has graciously expressed her intention of visiting our depot and training establishment at Crookham, Hants, on that date; and during the week, celebrations will take place in different parts of the country. In London a jubilee rally will be held in the Central Hall, Westminster, when short addresses will be given by the president of the Royal College of Surgeons, General Sir James Steele (the Adjutant-General), and General Sir William Slim. An attractive vocal and instrumental programme has been arranged, and the Corps band and bugles will recall memories of fifty years in addition to introducing our new regimental march to the public.

I should like to extend a most cordial welcome to our celebrations, to all who have served with the Corps during the last fifty years, be they Regular, Territorial, or Emergency commissioned, and also to our sister Medical Services in the Royal Navy and Royal Air Force.

The hon. secretary, R.A.M.C. Association, will be glad to send full particulars to any of your readers who may be interested, on application to him at 84, Eccleston Square, London, S.W.1.

ALEXANDER HOOD
Lieutenant-General,
London. Director-General, Army Medical Services.

ATTACK ON RHEUMATISM

SIR,—I read with interest your leading article of March 27 on the establishment of rheumatism departments in teaching hospitals, and I would like to contribute additional arguments in favour of this urgent reform. The vital need is apparent, for it is known that on a conservative estimate there are over a million sufferers from rheumatism in this country alone and that the economic loss amounts to some £40 million a year. One has only to visit a chronic hospital to realise that the treatment of this group of diseases is inadequate both in scope and standard.

The fault at the moment lies in the fact that the patient with "rheumatism" is dealt with by too many departments, for while the diagnosis is usually made by a physician a large part of the treatment is controlled either by the medical officer in charge of the physiotherapy department or by the orthopædic surgeon.

Improvement will come only when the diagnosis is made and the treatment supervised in every phase by one doctor—the rheumatic specialist—as is done, for example, in the fields of pulmonary and cardiac disease. This doctor must first be trained as a general physician so that he is competent not only to differentiate the type of rheumatic disease but also to recognise the neurological, peripheral vascular, osseous, and other diseases which are sent to hospital under the general heading of "rheumatism." He must be acquainted with orthopædic principles and be able to undertake plaster work and manipulation; and he must have a full knowledge of the scope and variety of physical methods so that he can not only make an accurate diagnosis but can carry out the whole of the treatment, save for operative measures when these are necessary.

It is only in a department concentrating on this group of diseases that the student can be taught both the variety of conditions under the general heading of "rheumatism" and also the technique of the various methods of treatment which are employed for each group. That this undergraduate teaching is important is emphasised by a recent Scottish survey which pointed out that "rheumatism" accounts for one-tenth of the work of the general practitioner. Such a department should be part of a general hospital since expert opinion may be required on the radiological, dental, gynæcological, psychiatric, and other aspects of particular cases.

Orthopædic surgeons have blamed rheumatism clinics and departments for referring cases to them too late, and for treating minor orthopædic conditions without the

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necessary knowledge. This difficulty has been solved at one teaching hospital by the attendance of the orthopædic surgeon for part of the largest weekly clinic, where he has been able to see cases at an early stage, take them over if necessary, and see that correct orthopædic principles are carried out. Such a liaison must be rare and is a tribute to the enthusiasm of the surgeon, but it is an ideal to be aimed at.

In the existing rheumatism departments physicians are being trained as specialists in the locomotor disorders, and clinical research is being undertaken with the stimulus that Hojer has foreseen. Only in this way will patients benefit from continuity of treatment, and one hopes that eventually cases of rheumatism will cease to be bundled from the general physician to the physiotherapy department, only too often ending up in the orthopædic department, too late for the surgeon to be able to help them.

London, S.W.1. OSWALD SAVAGE.

HEALTH CENTRES

SIR,—The letter from Dr. Chisholm in your issue of Feb. 28 refers to "rather hysterical defence of an obsolete system of medical service" in place of coöperation in the improvisation and development of health centres. I think the letter shows clearly the blindness, if not the deliberate attempt at distortion, which is being shown by many well-meaning people. Not only has Mr. Bevan suspended all building of health centres, but he has suspended the submission of plans, and has also discouraged the conversion of existing buildings. Before writing such letters, circular 3, 1948, issued on Jan. 14 should be studied. Mr. Bevan wishes local authorities to desist from making proposals or improvisations until he gives them permission to do so.

Can Dr. Chisholm produce one man who wishes to stick blindly to an obsolete medical system? The demand is for reasoned planning, for the safeguarding of present freedoms until new forms are properly secured, and for provision of some facilities at least before a new scheme is rubber-stamped into "action." Perhaps chaos would be a better word. The demand for decision by July 5 is in the circumstances tantamount to blackmail, and the question each of us should surely ask is, "Why is Mr. Bevan so anxious to obtain immediate control of the medical profession when other parts of the Act vital to efficient function are being postponed?"

Boston, U.S.A. M. E. M. HERFORD.

CALCIFEROL IN THE TREATMENT OF CHILBLAINS

SIR,—Dr. Obermer says in his letter of March 20 that he found my article[1] "not only unilluminating but misleading." It would appear that he found it unilluminating because it did not furnish certain information about chilblains, the effects of calciferol given by various routes, and the resulting biochemical changes. Since the paper set out merely to report an investigation of whether or not the incidence of chilblains in a certain group was affected by calciferol in large doses by mouth, his disappointment is difficult to understand.

His view that the article was misleading and in parts at variance with known facts, is more serious. He seems to base this charge chiefly on the sentence: "This therapy is hazardous unless controlled by estimations of blood-calcium (especially diffusible calcium) and of renal efficiency."

The 103 patients in the test group in my paper were such of a series of more than 200 under treatment with calciferol as were seen during the period of the test and examined for the presence of chilblains. They were carefully investigated clinically, biochemically, and in other ways. As a result of observations on these patients it was noted that though the total serum-calcium may not be raised in those with mild symptoms of calciferol intoxication, the diffusible serum-calcium is invariably raised.[2] As far as I am aware, this finding has not been disputed.

At the annual meeting of the British Association of Dermatology last July the results of investigations on 186 patients who had been treated with calciferol in high dosage were presented.[3] A rise in the diffusible serum-calcium was found to be the most reliable indication of toxicity in its early stages, and impairment of renal function, as judged by urea-clearance tests and blood urea-nitrogen levels, was demonstrated in a considerable proportion of toxic cases. In view of these biochemical changes it is improbable that the calciferol tablets were not absorbed.

In stating that there is no evidence of impaired renal function as the result of ordinary therapeutic doses of calciferol, Dr. Obermer, though irrelevant, may be correct. Having reviewed the very extensive literature on calciferol therapy in high dosage, I can assure him that doses of 100,000 I.U. daily, or more, have been shown to result in impaired renal function. A paper on the toxic effects of calciferol, by my collaborators and myself, awaiting publication, deals with this matter fully.

Dr. Obermer goes on to say: "On the basis of statistics derived from a single clinical experiment, Dr. Anning sums up as follows: 'These results suggest that calciferol is ineffective in preventing chilblains. . . .'" and he refers to my statements as sweeping. I must remind Dr. Obermer that the "single clinical experiment" considered 103 patients given calciferol and 150 controls, and that in my conclusions the words "in the conditions of this test" appear—a clause which Dr. Obermer has thought fit to exclude from his quotation.

Finally, I would add that the continued experience of my collaborators and myself with calciferol in high dosage has lessened in no way our belief that this therapy is dangerous to health unless carefully controlled by biochemical methods, and that it is my opinion that such treatment is unjustifiable for chilblains in view of the results I have obtained.

Leeds. S. T. ANNING.

"PACKING THE PHARYNX"

SIR,—It is well that attention should be drawn (as in your annotation of March 20) to the importance of employing a barrier between the mouth and the larynx during dental extraction. Your choice of title, however, is possibly misleading, and this is reflected in the description. The expressions "as a curtain between forceps and pharynx," "fails to pack the fauces," and "separating the operation area from the pharynx without obstructing respiration" indicate that the pack is in front of the pharynx.

The pack described is usually called a mouth-pack or throat-pack among dental surgeons. Without discussing the best type of pack or the method of insertion, we would suggest that the term "faucial pack" is more correct both anatomically and clinically for the pack described in the annotation; the term "pharyngeal pack" is thus reserved for that inserted in the pharynx as in endotracheal anæsthesia. Continued use of the same term for two such different techniques could well lead to a fatality. The term "faucial pack" can easily be criticised, and the word "diaphragm" or "barrier" might be preferable, but it is questionable whether such a term would pass into general usage.

The annotation appears to refer only to extractions under general anæsthesia. There is good reason to teach the use of some form of oropharyngeal diaphragm during extractions under local anæsthesia. Teeth sometimes break in an explosive manner, and especially when there are large metal restorations the risk of surgical and medicolegal complications cannot be excluded. A fold of gauze, more between the jaws than in the fauces, is appropriate in such cases.

There is a growing habit of inclining the patient backwards in the chair during dental extraction. In this position fragments dislodged from the upper posterior teeth can fall almost vertically through the groove between the base of the tongue and the faucial wall (the danger area in packing) into the larynx. During extractions the patient should sit relatively straight in the chair—that is, with the spine inclined backwards at about 20°

1. *Lancet*, 1947, ii, 794.
2. Ingram, J. T., Anning, S. T., Dawson, J., Dolby, D. E. *Ibid*, 1946, ii, 960.
3. Ingram, J. T., Anning, S. T., Dawson, J. *Brit. J. Derm.* (in the press).

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to the vertical, when the plane of the maxillary teeth will be found to be approximately horizontal. To prevent slipping, the "seat" may be tilted back slightly, most dental chairs permitting this while still keeping the back at the required angle. The anæsthetist should be well to the patient's left side, from which position he can best observe the condition of the patient and the course of the operation, instead of playing blind-man's-buff while balancing on one leg.

Finally, it should be emphasised that a faucial pack is but one line of defence. The fingers of the left hand of the operator, ensheathing the blade of the forceps and moving to intercept all fragments which crumble or disintegrate, are the real guardians of the larynx.

Plastic and Jaw Centre,
Hill End Hospital,
St. Albans, Herts.

B. W. FICKLING
N. L. ROWE.

TREATMENT OF ACTINOMYCOSIS

SIR,—Dr. Shorvon is to be heartily congratulated on his account of a patient with actinomycosis of the liver steered by good management to complete recovery (March 20, p. 439). He was undoubtedly wise to use all the known methods of treatment at the same time, as the condition is too serious to allow of any experiment. The multiplicity of remedies employed makes it, however, difficult to assess their relative values for future guidance. Probably different remedies would be effective in different patients, Colebrook having shown that there are numerous strains, or species, of the "ray fungus" pathogenic in man.

Many years ago I was faced with the problem of treating a middle-aged farmer who was in an advanced stage of lower abdominal actinomycosis and was almost moribund. Very little surgical interference was possible, and the patient was sensitive to iodine and its compounds, so that none could be used. It was before the days of the antibiotic drugs. The patient was accordingly treated by Dr. Finzi with small doses of irradiation with radium plaques, and after the organism had been grown he was also given large doses of an autogenous vaccine. With this treatment the patient gained 1 lb. a week in weight steadily over several months and finally went home quite well. The injection of vaccines produced no constitutional reaction whatever, and we were inclined to attribute the patient's recovery almost entirely to the irradiation. The tissue reaction to actinomycosis forms a dense barrier against all drugs, even those that are in the patient's circulating fluids. Irradiation, to which the organism is usually sensitive, is therefore the logical answer, but the dosage must be kept small since the treatment will have to be prolonged. Potassium iodide, the time-honoured remedy, is still commonly used, but there is little to be said in its favour, and it is probably useless.

London, W.1. GEOFFREY KEYNES.

POISONING BY FOOD PLANTS

SIR,—During the summer of 1947 at Dresden a benign syndrome suddenly appeared, due apparently to the excessive consumption of two plants. Observations were made on three inpatients and three outpatients. For many weeks these patients had been eating, two to three times a day, two weeds, *Chenopodium album* and *Atriplex patula*, which are closely related to the garden spinaches and beets and make a fairly tasty vegetable dish. They grow abundantly on the ruins and rubble-heaps of Dresden and became a popular dish during the food shortage of the spring and summer.

CASE 1.—A man, aged 71, was admitted on Aug. 2 with the history that since May he had eaten, three times a day, large quantities of both plants, but less of the atriplex, this being less abundant than the chenopodium. Gradual onset of fatigue and weakness. On Aug. 1 acute onset of œdema of face and hands, increasing rapidly in the next 24 hours. *On admission:* yellow pigmentation of skin, especially of palms and soles; pharyngeal wall also pigmented. Conspicuous œdema of face, particularly of eyelids, which could not be opened; scalp and hands also œdematous. General condition unimpaired; mentally bright and lively. Blood-pressure 125/85; erythrocyte-sedimentation rate (E.S.R.) 5 and 13 mm. after 1 and 2 hours respectively; Hb 77% (Sahli); red cells 3,820,000 per c.mm.; colour-index 1·01; white cells 5800 per c.mm. (stab cells 2%, segmented cells 65%, lymphocytes 33%); serum-protein by copper-sulphate method 6·5 g. per 100 ml.; serum-bilirubin 0·51 mg. per 100 ml. Takata-Ara test negative. Fractional test-meal with caffeine: no free HCl, total acid 20. Urine normal. *Progress.*—Patient made a rapid recovery on ordinary hospital diet, with addition of 'Betaxin' 1 ml. daily and a mixture of pepsin and HCl. He left in good condition after 4 weeks in hospital.

CASE 2.—A woman, sister of case 1, and living with him, was admitted about Aug. 4 with a similar history, except that she had eaten smaller amounts of the weeds. *On admission:* pigmentation and œdema as in case 1, but œdema less severe. General condition and mentality good. Blood-pressure 125/70; E.S.R. 9 and 20 mm. after 1 and 2 hours respectively; Hb 82%; red cells 4,040,000 per c.mm.; colour-index 1·02; white-cell and differential counts normal; serum-protein 6·9 g. per 100 ml. *Progress.*—Patient discharged herself on Aug. 14, feeling well; œdema had disappeared, but pigmentation was still present.

CASE 3.—A male concrete worker, aged 19, was admitted on July 7 with several weeks' history of increasing weakness. He had eaten both weeds daily since April. *On admission:* findings as in cases 1 and 2. Blood-pressure 110/75; fundi normal. E.S.R. 8 and 15 mm. after 1 and 2 hours respectively; Hb 83%; red cells 4,250,000 per c.mm.; colour-index 0·99; white cells 5200 per c.mm.; differential count normal; serum-protein 7·2 g. per 100 ml.; albumin 4·37 g. per 100 ml., globulin 2·83 g. per 100 ml. Fractional test-meal with caffeine: no free HCl, total acid 6. Blood-sugar 100 mg. per 100 ml. *Progress.*—Patient recovered on hospital diet and was discharged on Sept. 6 feeling well; pigmentation of skin had nearly disappeared.

CASE 4.—The mother of case 3 attended as an outpatient with similar but less pronounced signs and symptoms. Both she and her husband, who had a similar condition but not severe enough to make him see a doctor, had eaten large quantities of the two weeds.

CASES 5 and 6 reported with signs and symptoms identical with those of the other cases, but the œdema disappeared in a few days with no special treatment.

A case of cardiac œdema is reported for comparison with the preceding cases:

A woman was admitted with cardiac failure and œdema of legs. Palms and soles showed same pigmentation as in cases 1–6, but there was no œdema of face. Patient, who was a good witness, said that for 4 months she had eaten wild vegetables, nettles, dandelions, and yarrow. She recovered rapidly with digitalis and was discharged in good condition, with pigmentation still persisting.

There are two striking characteristics of this syndrome—the yellow pigmentation and the œdema. The pigmentation of peculiar distribution does not appear to have any special significance, since it is characteristic of an excessive intake of vegetable pigments and develops after overfeeding with other green vegetables and with carrots, citrous fruits, &c. The acute œdema of the face and hands associated with general weakness may, however, be taken as characteristic features of poisoning from an excessive intake of these two members of the chenopodiaceæ. The onset of œdema in July, when the plants come into flower, suggests that the flowers rather than the leaves contain the toxic agent, or that the plants develop the toxin at the flowering time. There is no clue to which of the plants is responsible for the syndrome; neither is known to contain any toxic agent, though saponins are known to occur in certain species—e.g., *A. hortensis*.

Kobert,[1] citing Matignon, describes under the name of "atriplicism" a syndrome occurring in China which is almost identical with the present syndrome and is attributed to the consumption of *Atriplex littoralis*. The symptoms are said to appear 10–20 hours after eating the whole plant, the young shoots being regarded as harmless. In our cases the whole plant had always been eaten. In the Chinese cases the œdema appeared on the exposed parts, and it is suggested that the toxin may be activated by sunlight.

Protein undernutrition does not appear to be a factor in the causation of the syndrome, since the serum-protein levels of our cases were within normal limits.

1. Kobert, E. R. Lehrbuch der Intoxikationen. Stuttgart, 1906.

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The low gastric acidity is also probably not significant, since many patients in Dresden at present show similar low acidities.

Confusion may arise about which plant is being eaten, since both plants are commonly called *Melde* in Germany, though this name should be used for the atriplex only, *Gänsefuss* being German for the chenopodium. Melde has been a well-known vegetable for many years, but Gänsefuss, being more abundant, formed the bulk of the vegetables eaten.

Since these cases were observed in this hospital similar cases have been reported from Leipzig and Berlin, but the fact that two different plants are involved was not noted.

I am indebted to Dr. Crecelius, medical director of the hospital, for permission to publish the cases.

Johannstädter Krankenhaus, Dresden. RUNIA SCHEUER-KARPIN.

THE DOCTOR'S WIFE

SIR,—I was much interested in your leading article of March 27. I do not think it is generally appreciated by doctors' wives that when their husbands pressed for the method of payment under the National Health Service Act being by capitation they were thereby agreeing to taking out "a contract of service" with the local executive council. As in all other forms of contract, the contracting party (the council) is only interested to see that the terms of contract are satisfactorily carried out. If, to do so, the contractor (the doctor) calls to his help his wife, secretary, dispenser, nurse, or chauffeur, this is surely not of interest to the contracting party—a point to bear in mind for the future.

Worthing. HAROLD LEESON.

SIR,—I have been a subscriber for many years to your journal and have always greatly valued the clinical matter and often your leading articles. Of late, however, your Socialistic views appear to have dimmed your realisation on the one hand of what the medical profession is fighting for and on the other hand what they are protesting against.

This myopia is very pronounced in your leading article on the Doctor's Wife. Of the League of Doctors' Wives you state: "The unregistered half of our profession is thus being mobilised to resist the first and only serious attempt to improve her lot." In the next paragraph you credit the doctor's wife with "economic advantages, usually including some domestic help." I much doubt that 50% of doctors' wives have any domestic help or more than a bare minimum; still fewer have a nurse for their children, secretaries and typists are hard to come by, and the efficiency of all these helps is far below pre-war standards. You then proceed to draw a fairly accurate picture of what the doctor's wife's responsibilities are and admit that for some time to come after July 5 her troubles are likely to be increased. At present she is a willing and grossly overworked helpmate to her husband, working with him to make the practice a success not only financially but still more clinically.

The relief you visualise for her apparently consists in the establishment of health centres. These are not likely to materialise for years to come, and the efficiency of them has yet to be proved. In addition, the Act is to come into force before the essential specialists are available, without any increase in hospital beds (already so occupied that waiting-lists have risen to gross figures) and with a dearth of nurses even for beds now available. No wonder that the doctor's wife is in revolt against a service which cannot, for many years, promise an amelioration of her present hectic existence.

I write as a specialist who spent some years in a general practice after a fairly wide experience of "locums" in a varied assortment of practices.

Norwich. H. J. STARLING.

SIR,—I have in the past followed with interest your comments on the various aspects of the National Health Service Act, and although disagreeing with a good deal of what you have had to say, I have felt that it was at least commendable that the "other point of view" should have such an honoured exponent as THE LANCET. It was therefore with a sense of alarm, if not nausea, that I read your article on The Doctor's Wife. I could only assume that the writer had never been in general practice or (if he had) had entered it with such a sense of class hatred that he was unable to think logically.

Working in a practice where there are potentially two non-insured to one insured patient I find that I see seven insured to each non-insured patient. I have never found "private" patients unreasonable in their demands, and I have not found it necessary to have separate surgeries for insured and private patients.

Surely the real reason why panel practice is irritating, is that it floods surgeries with trivialities and it leads to endless filling up of certificates—not just the N.H.I. certificate, but usually too for other clubs. Because of these two major factors, it leads one to feel at the end of a hard day that one has not done a satisfactory day's work because so much had to be done in a "slipshod" manner, simply because one cannot see 40–50 patients in a morning surgery and find time to finish visits before the evening surgery.

Whatever may be the rights and wrongs of the League of Doctors' Wives I beg of you, Sir, not to try and drag in the cry of the "rich over the poor." That hatchet was buried when the profession accepted the idea of a fully comprehensive service for all classes of the community.

Newport Pagnell, Bucks. A. A. CLAY.

SIR,—As you say, it is probable that when the new service starts there will, for a time, be an increase in the number of calls on the doctor. But it is, I believe, untrue that they will be frivolous and unnecessary. One can foretell pretty accurately their nature: they will mostly come from the anxious mother wanting reassurance which she has not hitherto felt justified in purchasing. To reassure an anxious mother, even if her anxiety is ill founded, is thoroughly worth while. A sudden rush of such calls would be a reflection on the adequacy of the present system rather than evidence of the shortcomings of the new.

Bagshot, Surrey. S. GRAHAM.

ANTI-HISTAMINE DRUGS IN ASTHMA

SIR,—A very strong case was made by Dr. Hunter and Professor Dunlop, in your issue of March 27, against 'Neoantergan' in the prevention of asthma. Before this drug is added to the already large scrap-heap of spurious remedies it should, I think, be subjected to further consideration to see whether it might still be of use in certain selected cases. For this purpose, one is tempted to ask for a little more information and to make some comments:

1. At what season of the year did each three-month control period fall? There is often a seasonal preponderance in allergic asthma, apart from those cases initiated by attacks of upper-respiratory infection which were deliberately excluded by the authors. Where psychological factors play a large part in causation, seasonal factors are usually less in evidence.

2. Attacks during the control period were treated with adrenaline or ephedrine. In the subsequent quarterly periods when neoantergan or dummy tablets were administered, were the attacks left to fizzle out without treatment of any kind unless status asthmaticus was present?

3. In most cases a record is made of the number of attacks but not their severity. Frequent mild attacks of bronchospasm can be less debilitating than less frequent but more severe attacks of asthma.

4. The daily dosage was divided into three parts. It is more customary in pædiatric practice to anticipate attacks of asthma by giving drugs once, or at most twice, daily. If the whole dose had been given at once, would results have been better?

Turning to the cases themselves, the authors roughly sort them into 3 groups: (*a*) those in which attacks became less frequent after using neoantergan or dummy tablets; (*b*) those in which attacks were just as frequent, or became more numerous or more severe ("status asthmaticus"); and (*c*) those, including the most severe cases, which did not respond to neoantergan. In this

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last group ephedrine or adrenaline must have been used so frequently that most cases had some treatment daily. Comparison, therefore, with the period on neoantergan would be misleading since during the latter period attacks not severe enough for the patient to be admitted to hospital were, on the information supplied, not treated.

It may be pure accident, but group (*a*) contains the largest proportion of children, and it is in this group that treatment, whether by active or dummy tablets, apparently achieved some measure of success. This points to there having been some psychological factors present which escaped the authors who, rightly, tried to select their cases to "eliminate as far as possible the psychological factor in response to treatment." It would appear that there is a very close link-up, especially in childhood, between emotion and allergy. As the child gets older, its psychosomatic manifestations tend to become less reversible and hence less amenable to psychotherapy, whether by suggestion or other means.

My own experience agrees with that of the authors in that severe asthma is not, in general, prevented by neoantergan alone, but I believe it to be more effective than ephedrine in preventing mild attacks. The authors have performed a most useful service in seeking to evaluate this new remedy. My plea is for the evidence to be sifted further so that we may know more about the ætiology, as well as the treatment, of asthma in childhood.

London, W.1. S. B. DIMSON.

PANCREATIC FUNCTION WITH MALNUTRITION

SIR,—You have recently published reports by Dr. Davies (Feb. 28) and Professor Véghelyi (March 27) on anatomical and functional lesions of the pancreas in infants with nutritional œdema and kwashiorkor.

For the sake of completeness, may I point out that in 1947 Dr. Carvalho and his collaborators [1] in Rio de Janeiro found diminished secretion of pancreatic trypsin and lipase in babies convalescing from a syndrome of multiple deficiency identical with kwashiorkor in Africa. Following a theory similar to that of Dr. Davies, they obtained good results by treatment with lipocaic; in 15 cases there were no deaths, whereas in 35 cases treated intensively with vitamins, liver extract, &c., the mortality was nearly 30%. Good results were also obtained with skimmed milk alone. In discussing his findings Dr. Carvalho drew attention to the work of Friedmann and Friedmann [2] who produced atrophic changes in the pancreas in rats on a diet poor in protein and rich in fat.

Medical Research Council, Human Nutrition Research Unit, National Hospital, Queen Square, London, W.C.1. JOHN WATERLOW.

A QUOTATION

SIR,—In answer to Dr. Lambert's question (March 6) about the origin of the sentence, "Guérir quelquefois, soulager souvent, et consoler toujours," I can inform you—with *From Hippocrates to Carrel, Aphorisms about Doctors and the Art of Medicine*, by Dr. A. Aggebo as my source—that it was said by Cabanès in the 15th century: "La présence d'un Médecin profite beaucoup. Son rôle est de guérir quelquefois, soulager souvent et consoler toujours."

May I from the same book quote an example of the last duty? A Danish doctor told a farmer with a slight tuberculous lesion of the lung: "Those tubercles of yours aren't at all serious. There are only six, and all of them are males."

Viby, Denmark. O. ASHOLT.

SIR,—Hippocrates was the first to use the words "guérir quelquefois, soulager souvent, consoler toujours." Dr. Lambert may be interested to know the ancient Greek words written by our medical father: "Ὁ Ἰατρὸς παρηγόρει, ἐνίοτε βελτίει, οὐδέποτε θεραπεύει."

Athens. G. I. MICHAELIDIS.

1. Carvalho, M., Schmidt, M. M., e Pinto, A. G. *J. Pediat., Rio de Janeiro*, 1947, **13**, 141. Carvalho, M. *O Hosp., Rio de Janeiro*, September, 1947, p. 307.
2. Friedmann, S. M., Friedmann, C. L. *Canad. med. Ass. J.* 1946, **55**, 15.

CLICKING PNEUMOTHORAX

SIR,—When serous membranes, normally lubricated by a little fluid and covering moving organs such as heart and lungs, are also brought into contact with air, as in artificial pneumothorax, it is not difficult to imagine that the sudden separation of localised areas of these surfaces may give rise to sounds audible outside the body. Since these sounds are rarely, if ever, of clinical significance prolonged speculation as to the exact mode of origin in each case is perhaps superfluous.

Colindale Hospital, London, N.W.8. W. E. SNELL.

FAVISM

SIR,—The heading of your annotation on this subject (March 27) poses the question whether this condition is toxic or allergic. The employment, by those working in an endemic area, of the anti-human-serum test for sensitised red blood-cells [1] might possibly help to give an answer.

Grays, Essex. R. N. HERSON.

AVOIDANCE OF GONOCOCCAL ARTHRITIS

SIR,—Although I have not, like Dr. C. D. Alergant (March 27), recently seen any large number of cases of gonococcal arthritis, I can confirm his observation that once a patient has had this complication he is very likely to develop it again if he subsequently contracts gonorrhœa. I have already drawn attention to this point.[2]

Another point of even greater importance—and one which is as little stressed—is seen in the treatment of gonococcal arthritis. If the patient, particularly in a second or subsequent attack, is treated by complete immobilisation of the affected joints his chances of complete functional recovery are jeopardised. A little movement, gradually increasing, must be allowed if adhesions in the joints are to be avoided.

It should also be remembered—as Mr. A. J. King has so often pointed out—that the best treatment (penicillin not excluded) for gonoccoccal arthritis is hyperthermy.

London, S.W.1. JAMES MARSHALL.

GERONTOCRACY IN OUR TIME

SIR,—Prof. Robert Platt does not question the ability, distinction, or integrity of the B.M.A. representatives. At the risk of being considered "ill-mannered," he tabulates their years. It is, however, this matter of years which finally absolves them from any suspicion of self-interest. They have arrived. And they believe, as most of us do, that the Act as it stands is a bad Act.

They are also realists. A new Law, many more bureaucrats, still heavier taxation, do not of themselves create a National Health Service. It needs doctors, nurses, health centres, hospitals—a whole lot of them—and by no stretch of the imagination can these be available on July 5, 1948. Nor on July 5, 1958, at the present rate of recruitment and building.

Bognor Regis. H. D. L. SPENCE.

NOSE AND SKIN CARRIAGE OF STAPHYLOCOCCUS AUREUS

SIR,—Mr. Roberts in your issue of March 6 draws attention to "staphylococcal nasal vestibulitis." Whilst agreeing that such a clinical condition does occur, I would like to emphasise that bacteriological infection often exists without abnormal changes visible to the naked eye.

Thus of 34 cases[3] persistently growing *Staph. aureus* on culture of the vestibular swab, 23 had a normal appearance of the vestibular skin and vibrissæ and there was no history of furunculosis or fissuring. Among the remaining 11, in 7 the skin was judged to be atrophic although free from crusts or fissures, in 9 the vibrissæ

1. Coombs, R. R. A., Mourant, A. E., Race, R. R. *Lancet*, 1945, ii, 15.
2. The Venereal Diseases. London, 1944; p. 83.
3. Moss, B., Squire, J. R., Topley, E., Johnston, C. M. *Lancet*, Feb. 28, p. 320.

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were scanty or atrophic, and in 5 there was a history of previous furunculosis of the vestibule. In short, the majority of *Staph. aureus* nasal carriers showed no abnormality of the vestibular skin.

Birmingham Accident Hospital. C. M. JOHNSTON.

REQUEST FOR SUPRARENAL TUMOURS

SIR,—We are interested in making a pharmacological examination of tumours of the suprarenal medulla. As these are relatively rare, we write to ask any who have the opportunity to send us a portion of a freshly excised tumour by post. A portion (about 2 g.) should be covered with about 5 c.cm. of *N*/10 HCl in which it should be cut up fine with scissors. It would be a help if we could be told the total weight of the tumour, the weight of the portion sent, and the volume of hydrochloric acid.

Department of Pharmacology, Oxford. J. H. BURN
PAMELA HOLTON.

THE TEACHER'S SALARY

SIR,—In your editorial comment on my letter last week you have not, I think, met my criticism. My point is that though £1200–2000 a year, all expenses found, may be considered meagre for a medical teacher, it is not comparable with the salary of the general practitioner, which will be about £600 a year, all expenses found. Your statements about reduction of expenses through giving up dispensing, and increase of income by doubling of the mileage allowance, rather fog the issue. Not unnaturally I had taken both these items into consideration before arriving at the possibility of a net income of £600 a year. Your last statement about "inducement grants" smacks unpleasantly of a means test. For over fifty years the value given by this family to the people of this district has been assessed, by the people whom we serve, sufficiently to ensure a certain standard of living. Must we, under the new Act, undergo a means test to continue to enjoy this standard of living?

Ruthin. ENID HUGHES.

SIR,—I have read with interest the letter from my friend, Dr. Enid Hughes, and your comment pointing out the relief available in cases of special hardship. Is it not her point, however, that the hardships in question are to be anticipated *as a rule*—not merely in exceptional cases—and that they will be incurred by the conscientious practitioner in direct proportion to the amount he tries to do for his patient? The effect is to put a premium on enterprise and to reward professional indifference. This, surely, is the burden of Dr. Hughes's complaint. She says in effect: "If my husband and I continue to offer to our patients the service which they expect and we have always given, we shall have precious little left for ourselves."

Department of Surgery, University of Liverpool. CHARLES WELLS.

Parliament

THE BUDGET

Sir Stafford Cripps, Chancellor of the Exchequer, presenting his first Budget last Tuesday, said that Marshall aid came as a light and hope. Nevertheless we must make sure of necessities and could not indulge in luxuries. He estimated expenditure at £2976 million, or £205 million less than last year, and to counter inflationary tendencies budgeted for a true over-all surplus of £300 million. Public current expenditure would absorb 22% of the national income against 16% in 1938; social services would be maintained, and food subsidies continue at £400 million. Purchase-tax would be readjusted; the exemption limit for income-tax would be raised from £120 to £135; and earned-income allowance would increase from a sixth to a fifth (maximum £400). The first £50 taxable income would be charged at 3*s.* in the £ and the next £200 at 6*s.* Where total incomes exceeded £2000 special levies rising from 2*s.* to 10*s.* in the £ would be made on proceeds of investment exceeding £250. Taxes on betting, tobacco, wines, and spirits would be further raised.

Obituary

ROY FREW YOUNG

M.C., B.A., M.B. CAMB., LL.D. GLASG., F.R.F.P.S.

Mr. Roy Young, consulting surgeon to the Western Infirmary, Glasgow, died on March 12 at the age of 68.

He was educated at Glasgow Academy, Sedbergh School, and Cambridge University, where he graduated in arts and medicine in 1907. At school he had excelled in sport, but a femoral thrombosis, which was to leave a life-long disability, restricted his part in university athletics and denied him the Antarctic adventure for which he had been accepted. Though the most honest of men, he did not hesitate in 1914 to employ a most honourable subterfuge to delude a medical officer into accepting him for military service. He spent three years as R.M.O. to a field squadron, R.E., with the 3rd Cavalry Division in France, and only in the last year of the war was employed as a surgical specialist. He was awarded the Military Cross and was twice mentioned in despatches.

He returned to civilian life to practise and teach clinical surgery, serving the Western Infirmary as an assistant surgeon until 1924, and as a visiting surgeon until 1944. In 1924 he was appointed a clinical lecturer in the university.

Young's devotion to his public work led him to decline many private patients, but he was among the most popular consultants. Here too the well-being of the patient was his prime consideration, and his disdain of gain was illustrated by the readiness with which he referred private patients to colleagues or assistants with special experience. The Henry Brock Hospital at Alexandria in the Vale of Leven had a special place in his affection. Consulting surgeon from its opening in 1924, he played a great part in building its reputation, and nothing was allowed to interfere with his Thursday afternoon visits.

The outbreak of the late war found him at his zenith as clinician and teacher. He took up the heavy additional burdens without complaint. When in 1939 a colleague offered him sympathy that all his assistants were already in the Services, Roy Young replied, with the double-entendre which he loved, "Yes, thank God." About this time too the affairs of the Royal Faculty of Physicians and Surgeons of Glasgow were making additional calls on him. From 1940 to 1942 he served it as an outstanding president and made great contributions to long-term constructive policy. Some of these he saw come to fruition. Others were too idealistic to obtain immediate support, but his tolerant advocacy of them still remains a force.

For many years he was a manager of the Western Infirmary, and latterly he was chairman of its medical committee. In this capacity and as president of the Glasgow Royal Cancer Hospital his counsel was thoughtfully given and highly esteemed. But many interests claimed his time and energy. He was a governor of his old school, Glasgow Academy; he was honorary surgeon to the Glasgow and West of Scotland Coöperation of Trained Nurses; he was for many years the beloved president of the Glasgow University rugby club; and he was an active member of the university committee on postgraduate medical education. Each year his house-surgeons were invited to his home to meet the ever-increasing number of their predecessors, and on his appointment as consulting surgeon to the Western Infirmary in 1944 they presented his portrait at a memorable dinner to Mr. and Mrs. Young. A year ago he graduated for the first time at the university which he had served with such distinction, when Glasgow University adopted the unusual course of conferring on a retired clinical lecturer the honorary degree of doctor of laws. The great company who gathered for his funeral service in Wellington Church, where his grandfather had been minister, was representative of the multitude of patients, students, nurses, doctors, and laymen who held him in affection.

Mrs. Young, who died eight months ago, was formerly Elizabeth Anne Hay, a sister in the Western Infirmary. They were married in 1917.

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A. B. K., to whom we are indebted for much of this memoir, writes: "Young's clinical work was characterised by accuracy and care in investigation and in preoperative treatment, and by meticulous annotation. In the operating-theatre he was courageous, thorough, and swift. He had a high sense of responsibility for his hospital patients and would seldom undertake a major operation without returning to hospital later in the day, for while he delegated responsibility fully to those working with him, he estimated correctly the value to the patient of a personal word of encouragement from the Chief. His leadership and example were rewarded by the willing coöperation of his medical and nursing staffs. Anyone who failed to act up to his standards was more likely to earn reproof through failure in duty or in consideration to patients than through ignorance. He took care to provide for each of his team the experience and encouragement best calculated to advance their interests and knowledge, and he spent many hours helping his juniors. As a teacher his reputation was unrivalled. Classes were carefully arranged within the limits of his clinical material to give the student a progressive introduction to the principles of surgery. Young prepared himself for teaching as thoroughly in his last year as in his first, and had a real gift for clarifying the technical issues. Many a graduate looks back on his session with Roy Young as the time when he learned how to handle sick men and women with sympathy and courtesy, and how to impart to them the confidence which can mean so much in therapy."

WALTER RUPERT REYNELL

M.A., D.M. OXFD, F.R.C.P.

Dr. W. R. Reynell, physician and neurologist to the Royal Northern Hospital, London, and formerly senior physician to the West End Hospital for Nervous Diseases, died on March 21.

Born in South Australia in 1885, he was educated at St. Peter's College, Adelaide, and came to Oxford as a Rhodes scholar in 1906. From Oxford he went to Guy's Hospital, where he took the Conjoint qualification in 1912, taking his Oxford degree the following year. From an early stage of his training, influenced much by Arthur Hurst, he was interested in neuropsychiatry. During the first world war while serving with the R.A.M.C., latterly at the Seale-Hayne Hospital for neurological cases, he gained much experience in this branch of medicine. After his demobilisation he was appointed to the staff of the West End Hospital and later to the staff of the Royal Northern Hospital, where he was in charge of the neurological department. He was elected F.R.C.P. in 1934.

One of his colleagues at the Royal Northern writes: "Perhaps, like most of the scholars from overseas, Reynell was more mature in character than the average undergraduate and with a greater sense of novelty and capacity for criticism. Oxford was his first impression of the English way of life, which he found so acceptable, and it continued as his main background throughout life. A quiet and always serious student, he could and did enjoy the lighter side of university life. A natural athlete with fine physique, he succeeded easily in the sports he enjoyed. Besides being captain of the tennis team, he boxed heavyweight for the university and was a good performer in winter sports. At the same time with an inquiring mind he was stimulated by contact with men such as William Osler, of whom he spoke so often in appreciation.

"Reynell did not write much; the value of his work lay in personal contacts. In a large private practice he was most successful with psychiatric cases, and many will miss him greatly. He always seemed to be helping people patiently to build or restore a confidence in themselves and to bring a kindly and rational solution to their emotional problems. When he realised that all was not well with himself, Reynell maintained the philosophic poise he had endeavoured to teach to others. He had only a few intimate friends and these have lost a quietly humorous, kindly, learned, and lovable person."

In the late war Reynell was delighted to return to Oxford to work as neuropsychiatrist at the head injuries unit. Of his work there W. R. R. tells us: "Reynell's wide experience of practical psychiatry in civilian life, and of battle neurosis during the first world war, made him a specially useful addition to the neurological staff. He took great interest in devising psychometric tests for detecting loss of mental capacity after head injury, and the large number of reports he made are carefully preserved for reference: these are still of great value in the treatment and care of those many soldiers and airmen who were studied by Dr. Reynell when convalescent from brain wounds. A natural physician, he never failed to take extra time and trouble if by so doing he could help his patients or colleagues. He had the highest ideals, and his conscientious devotion to duty never faltered. We who worked with him came to admire his philosophy and to enjoy his friendship."

Dr. Reynell married in 1916 Miss Una Mary Shaw-Stewart, and they had two daughters and three sons, one of whom was killed in the war.

Prof. JAMES MCINTOSH, who held the chair of pathology in the University of London at Middlesex Hospital, died at Aberdeen on April 5.

Births, Marriages, and Deaths

BIRTHS

BONNIN.—On March 31, at Newmarket, the wife of Mr. J. G. Bonnin, F.R.C.S.—a son.
D'ABREU.—On Feb. 7, in London, the wife of Mr. Frank D'Abreu, F.R.C.S.—a daughter.
GORDON.—On March 22, at Hanger Hill, Middlesex, the wife of Dr. Douglas Gordon—a daughter.
HOBBS.—On March 27, in London, the wife of Mr. Henry Hobbs, F.R.C.S.—a daughter.
JENKINS.—On March 31, at Enfield, Middlesex, the wife of Dr. C. R. Jenkins—a son.
KERSHAW.—On March 25, at Leamington Spa, the wife of Dr. G. R. Kershaw—a son.
LYTLE.—On March 25, at Southsea, the wife of Dr. William Lytle—a son.
MILTON.—On March 27, at Haslemere, the wife of Dr. Roland Milton—a daughter.
PORTER.—On March 29, the wife of Dr. H. L. Porter—a son.
SAMPSON.—On March 31, the wife of Dr. R. Sampson—a son.
WILLIAMS.—On March 25, at Nottingham, the wife of Dr. Gwynne Williams—a daughter.
WOOD.—On March 22, at Oxford, to Dr. Elizabeth Wood, wife of Dr. Ben Wood—a son.

MARRIAGES

KELSALL—MILLER.—On March 24, in Glasgow, Alan R. Kelsall, M.D., to Margaret Hay Miller, M.B.
STEVENSON—FERGUSON WOOD.—On Feb. 26, at Addlestone, Surrey, John Stevenson, M.R.C.S., to Marjorie Ferguson Wood, S.R.N.
WAY—CATTERMOLE.—On April 3, at Radlett, Stephen Philip Berkeley Way, M.B. Lond., to Jean Cattermole, S.R.N.

DEATHS

GEFFEN.—On March 24, in London, Maximilian Walter Geffen, M.R.C.S., D.P.H.
HARKE.—On March 31, in London, Wilfred Vaughan Harke, M.R.C.S., D.P.M., aged 52.
HUNTER.—On March 26, Alison Mary Hunter, M.B. Glasg., F.R.C.O.G.
MAY.—On April 2, at Botley, Hants, Henry James May, M.B. Camb., aged 80.
MURISON.—On March 26, Alexander Logan Murison, B.A. Camb., M.R.C.S., aged 76.
POLLOCK.—On March 29, Aileen Marion Seton Pollock, F.R.C.S.E.
STRATFORD.—On March 27, at Burwash, East Sussex, Howard Martin Stratford, F.R.C.S.E.

Public Health

Notifications of Infectious Diseases

ENGLAND AND WALES

Disease	Week ended March 6	13	20	27
Cerebrospinal fever	42	55	49	53
Diphtheria	200	173	173	154
Dysentery	184	213	170	136
Encephalitis lethargica	...	1	1	1
Measles, excluding rubella	8788	8449	10,034	9308
Ophthalmia neonatorum	67	42	92	38
Paratyphoid fever	2	3	2	1
Pneumonia, primary or influenzal	794	933	963	720
Polioencephalitis	1	..	2	1
Poliomyelitis	22	20	20	17
Puerperal pyrexia	94	120	145	103
Scarlet fever	2069	2027	1847	1526
Smallpox	...	..	...	..
Typhoid fever	5	4	6	4
Whooping-cough	3067	3418	3304	2803

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Notes and News

A SCULPTOR'S VIEW OF SURGERY

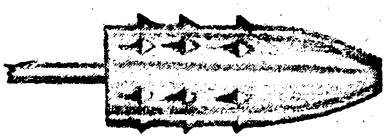
THE work of some modern artists is incomprehensible because of apparent distortion. Barbara Hepworth's sculpture is conspicuous for beauty of form and refinement of craftsmanship. By direct carving in stone or wood, her work is in the tradition which reaches back in history from Rodin through Michelangelo, Donatello, and the Greeks to Palæolithic art. The proper balance of what is removed in a carving to what is left; the careful analysis of internal structure to external form; the association of fine texture with colour—all these give her work a quality which appeals to scientists as well as to artists. Medical men have at present another reason for interest in it, for Miss Hepworth has found in an orthopædic surgeon's operating-theatre a subject of particular sculptural quality which she has revealed in a series of drawings.

Surgeons are apt to shut themselves in a secluded world and remain oblivious to such qualities in their surroundings—the perfect architectural setting with its central grouping of people, all coördinated for a particular object with economy of movement, timeless consideration, and complete simplicity and fitness for purpose. There is truly a peculiar drama in an operating-theatre; though not in the sentimental sense of the popular press. There is the preparation, the logical step-by-step progress, and the completion. With such sculptural grouping and dramatic movement goes a certain solicitude and a sense of the "unseen" patient, who, for the moment, is the material in the surgical craftsman's hands.

These are the qualities which Miss Hepworth seems to give us in the drawings on view until the end of the month at the Lefevre Galleries, 131, New Bond Street, London, W.1. Herbert Read has likened them to the work of the Italian masters of the Quattrocento, and certainly there is a "universality" in their character which takes us back to the past.

ROUGHENED NEEDLE-HEAD FOR TREATING VARICOSE VEINS

Mr. R. Rowden Foote, M.R.C.S., writes: The needle-head illustrated here is a modification of that on the Stevenson's needle and presents the following advantages: (1) it has a "nutmeg-grater" surface which scarifies the venous intima and ensures a more perfect thrombosis than when sclerosant alone is used; (2) gentle manipulation of the pliant shaft will traumatise the intima without causing unnecessary



Enlarged view of needle-head.

damage; and (3) the rocket-shaped nose of the needle-head facilitates the entry of this instrument into the vein.

The shaft is usually 12 in. long, and it is fitted with a 'Record' needle mount. The needle-head is 1 cm. long and 5 mm. in diameter.

This instrument was made for me by Messrs. John Bell & Croyden Ltd., and I am indebted to Mr. T. M. Proudfoot of that firm for his patience and interest and for the many specimens made before I was finally satisfied.

CEREBRAL PALSY IN BIRMINGHAM

LAST June the Midland Spastic Association was formed to promote the welfare of children suffering from cerebral palsy. The council includes Prof. J. M. Smellie and Dr. Jean Mackintosh, and the aim of the association is to ascertain and register, as far as possible, all children in the region suffering from cerebral diplegia and allied conditions. It is estimated that there must be some 170 such children among those of school age in Birmingham, as well as some 110 under the age of five years. By arrangement with the Institute of Child Health, a clinic has been opened at the Birmingham Children's Hospital to study such children clinically and to assess their intelligence. Educable children will be taught at a day school—Carlson House, Victoria Road, Harborne—which is to be staffed by teachers, physiotherapists, and speech and occupational therapists working in close touch with medical and surgical specialists.

University of Sheffield

At recent examinations the following were successful:

M.D.—R. T. Gaunt.

M.B., Ch.B.—E. J. Clegg, D. A. J. Tyrrell (with second-class honours); Mary Austin, Margaret E. J. Bolsover, Barbara Briggs, Eustace Evans, Joan Ford, Raymond Harrison, J. A. Howarth, Barrymore Humphries, Peggy C. Neill, Margaret M. Platts, Kathleen E. S. Pringle, O. H. Simms, Charles M. Sutherland, V. C. H. Tyson, J. W. Warboys.

Lord Addison, F.R.C.S., is to receive the honorary degree of doctor of laws at the installation of Lord Halifax as chancellor of the university on July 2.

University of Bristol

At recent examinations the following were successful:

D.R.D. (Part II).—G. R. Airth, David Livshin, E. G. Redman, N. F. Walsh.

University of Aberdeen

On April 1 the following degrees were conferred:

M.D.—E. D. Mackworth (commended), W. D. Wilson.

M.B., Ch.B.—Leslie M. V. Aitken, Doris I. Bisset, N. MacG. D. Blyth, A. G. Davidson, Elma R. Davidson, J. M. Ferries, Margaret Humble, W. B. Kennedy, K. S. H. Macgregor, A. G. Milne, Lorna Wheelan, Jeannie S. Wood.

University of Durham

On Wednesday, May 5, at 5 P.M., at the Royal Victoria Infirmary, Newcastle-on-Tyne, Sir Heneage Ogilvie will deliver the third Rutherford Morison lecture. His subject is to be A Surgeon's Life.

Royal College of Physicians of London

The following resolutions were passed by the comitia on March 22:

1. The college affirms its desire for unity and recognises that the comprehensive health service cannot be successful without the willing coöperation of all branches of the profession.
The college believes that this can be furthered if the Minister of Health makes clear in an amending Act that a whole-time service shall not be brought in by regulation; so that if any future Government desires to introduce such a service, a fresh Act of Parliament would be required.
The college reaffirms its opposition to a whole-time medical service.

2. A principal cause of the present discontent with the National Health Service is the power possessed by the Minister of Health to change its character by regulations. The college therefore suggests that an Amending Bill should be introduced to make regulations affecting the National Health Service subject to special procedure.

Particulars of the lectures in general medicine which are being given at the college, Pall Mall East, S.W.1, from May 3 to June 25, will be found in our advertisement columns this week.

Royal College of Surgeons of England

Faculty of Anæsthetists.—At the request of the Association of Anæsthetists of Great Britain and Ireland, the college, acting under the powers granted in the new supplemental charter, has formed a faculty within the college for those devoting themselves to the science and practice of anæsthetics. The following have been elected to the board of new faculty: Dr. A. D. Marston (dean), Dr. Bernard Johnson (vice-dean), Dr. I. W. Magill, Dr. E. S. Rowbotham, Dr. C. Langton Hewer, Dr. R. E. Pleasance, Dr. W. Alexander Low, Dr. Frankis T. Evans, Dr. John Gillies, Prof. R. R. Macintosh, Dr. J. H. Challis, Dr. George Edwards, Dr. Katherine G. Lloyd-Williams, Dr. B. L. S. Murtagh, Dr. A. H. Musgrove, Dr. H. J. Brennan, Dr. V. F. Hall, Dr. R. F. Woolmer, Dr. G. S. W. Organe, Dr. T. C. Gray, Dr. E. A. Pask. Sir Alfred Webb-Johnson, president of the college, Sir Cecil Wakeley, and Mr. L. E. C. Norbury, vice-presidents, are also members ex-officio.

The board held its first meeting on March 24, when it was decided to grant a fellowship of the faculty (F.F.A., R.C.S.) to those achieving distinction in the specialty.

Courses on Tuberculosis

The National Association for the Prevention of Tuberculosis, with the Joint Tuberculosis Council, is holding the following refresher courses for doctors: radiology in connexion with tuberculosis and chest diseases, Leeds, Sept. 20 to 23; non-pulmonary tuberculosis including lupus, Lord Mayor Treloar Hospital, Alton, Hants, Oct. 5 to 7; clinical courses, Cheshire Joint Sanatorium, Market Drayton, Salop, April 27 to 29, May 11 to 13, May 25 to 27. Further information may be had from the secretary, N.A.P.T., Tavistock House North, W.C.1.

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Royal College of Obstetricians and Gynæcologists

A postgraduate course of ten lectures for those studying the special practice of obstetrics and gynæcology will be given in the college house, 58, Queen Anne Street, London, W.1, from April 19 to 23 daily at noon and 5 P.M. Further particulars will be found in our diary of that week.

South-East Metropolitan Regional Hospital Board

Mr. A. Smith Lampard has been appointed chairman of the South-east Kent hospital management committee.

South-West Metropolitan Region Psychiatric Advisory Group

There will be a meeting of the psychiatrists in the region at the County Hall, Kingston-upon-Thames, on Wednesday, April 21, at 2.30 P.M. Those intending to be present are asked to notify Dr. T. P. Rees, the hon. secretary, Warlingham Park Hospital, Warlingham, Surrey.

Naval Medical Compassionate Fund

A meeting of the subscribers of this fund will be held at 3 P.M., on Friday, April 23, at the medical department of the Navy, Queen Anne's Mansions, St. James's Park, London, S.W.1, to elect six directors.

West London Hospital

The first Simpson Smith memorial lecture will be delivered at the hospital on Thursday, June 10, by Mr. Norman Tanner. He is to speak on Hæmatemesis and Melæna—an investigation of the place of surgery in its treatment.

International Congress on Obstetrics

An International Congress on Obstetrics and Gynæcology, to be held in New York between May 14 and 19, 1950, is being sponsored by the American Committee on Maternal Welfare in conjunction with the Fourth American Congress. Inquiries should be addressed to the general chairman of the congress, Dr. Fred L. Adair, at 24, West Ohio Street, Chicago 10, Illinois.

Scottish Society of the History of Medicine

A preliminary meeting will be held at the Royal College of Surgeons, Nicolson Street, Edinburgh, on Friday, April 23, at 5 P.M., with a view to establishing this society, when Dr. Douglas Guthrie will make a brief statement on its constitution and aims. Dr. H. J. C. Gibson will read a paper on the Early Days of Dundee Royal Infirmary.

National Conference on Industrial Safety

The Royal Society for the Prevention of Accidents is holding the Industrial Safety Section of its congress this year as a residential conference at the Royal Hotel, Scarborough, from June 10 to 13. Further particulars can be had from the society's industrial safety division at 131, Sloane Street, London, S.W.1.

British Medical Association

Dr. Peter Macdonald and Prof. R. M. F. Picken have been elected vice-presidents.

Dr. A. Macrae and Dr. D. P. Stevenson have been appointed deputy secretaries. The Scottish secretary (who is Dr. E. R. C. Walker) is also to hold the status of a deputy secretary. Dr. E. Grey Turner has been appointed an assistant secretary in place of Dr. J. H. Bruce, who has resigned to take up general practice.

International Congress of Physical Education

An international congress is to be held in Venice from May 10 to 13 when the following topics will be discussed: medical gymnastics, school gymnastics, the medical aspect of athletics, and the socio-medical aspect of gymnastics. Further information may be had from the executive committee, S. Fantin 2004, Venice.

Dr. K. E. Eckenstein has been appointed chevalier of the Order of St. Charles in recognition of his services as vice-consul at the consulate-general of Monaco in London.

Dr. J. M. Cure has been appointed a member of the executive council of the colony of Mauritius.

Diary of the Week

APRIL 11 TO 17

Monday, 12th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
6.15 P.M. Dr. W. S. McConnell: Anæsthesia for Dental Surgery.
MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
8.30 P.M. Prof. A. M. Boyd, Mr. A. Dickson Wright: Recent Changes in the Treatment of Gangrene.
ROYAL SOCIETY OF ARTS, John Adam Street, W.C.2
4.30 P.M. Dr. Frankis Evans: Recent Advances in Anæsthesia. (First of three Cantor lectures.)

Tuesday, 13th

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1
5 P.M. Dr. F. J. Nattrass: Clinical and Social Problems of Epilepsy. (First Lumleian lecture.)
ROYAL COLLEGE OF SURGEONS
6.15 P.M. Dr. Frankis Evans: Anæsthesia for Rectal Surgery.
UNIVERSITY OF EDINBURGH
5 P.M. (Physiology class-room.) Dr. Douglas Guthrie: Historical Background to Medicine.

Wednesday, 14th

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Dr. Howard Bruce Wilson: Anæsthesia for Children.
HARVEIAN SOCIETY OF LONDON
4.15 P.M. (St. Mary's Hospital, W.2.) Sir Alexander Fleming, F.R.S.: Penicillin Dosage.
INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
10 A.M. Mr. J. D. McLaggan: Treatment of Cardiospasm.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. R. E. Smith: Opportunities of the School Medical Officer.

Thursday, 15th

ROYAL COLLEGE OF PHYSICIANS
5 P.M. Dr. Nattrass: Clinical and Social Problems of Epilepsy. (Second Lumleian lecture.)
ROYAL COLLEGE OF SURGEONS
6.15 P.M. Dr. John Beard: Post-anæsthetic Treatment.
ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 26, Portland Place, W.1
7.30 P.M. Dr. R. E. Rewell: Diseases of Tropical Origin as seen in Captive Wild Animals.
BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1
8 P.M. Sir Ernest Rock Carling: "... the Future comes apace, what shall defend the interim ..." (Mackenzie Davidson lecture.)
HONYMAN GILLESPIE LECTURE
4.30 P.M. (Edinburgh Royal Infirmary.) Dr. A. Rae Gilchrist: Congenital Heart Disease.

Friday, 16th

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Dr. W. W. Mushin: Applied Anatomy.
FACULTY OF RADIOLOGISTS
2.30 P.M. *Diagnosis section.* (Royal College of Surgeons.) Dr. Jack Spencer (Portland, Maine): Acute Mechanical Obstruction of the Small Bowel.
BRITISH INSTITUTE OF RADIOLOGY
8 P.M. Prof. W. T. Astbury, SC.D., F.R.S.: Structure of Biological Tissues as Revealed by X-ray Diffraction, Analysis, and Electron Microscopy. (Silvanus Thompson lecture.)
INSTITUTE OF NEUROLOGY, National Hospital, Queen Square, W.C.1
2 P.M. Dr. J. G. Greenfield: Pathology of Encephalitis.

Appointments

ASHER, R. A. J., M.D. Lond., M.R.C.P.: physician, Central Middlesex County Hospital.
BEAVEN, T. E. D., M.B. Birm., M.R.C.P., D.C.H.: pædiatrician, West Cheshire.
BLAKE, H. E., M.A., B.CHIR. Camb., F.R.C.S., F.R.C.S.E.: plastic surgeon, Royal Alexandra Hospital for Sick Children, Brighton.
DUNN, C. H., M.R.C.S., D.A.: senior anæsthetist, West Middlesex County Hospital.
HARTSTON, W. L., M.D. Lond., M.R.C.P., D.P.H., D.T.M. & H.: deputy county M.O.H., Middlesex.
HUNT, T. A., M.SC., M.B. Sheff.: mines M.O., North Midland Region, Nottingham.
MASON, H. A. C., M.B. Lond., D.P.M.: psychotherapist, King's College Hospital, London.
REES, HARLAND, M.A., B.M. Oxfd, F.R.C.S.: asst. surgeon, urological department, King's College Hospital, London.
STOKES, K. R., M.R.C.S.: medical director, Harefield County Hospital.
WHYTE, J. D., M.B. Aberd.: mines M.O., Midland Region, Birmingham.

CHEMOTHERAPY IN COURT.—On Feb. 14 we gave an account of the judgment of Mr. Justice Jenkins in favour of a petition by Boots Pure Drug Co. Ltd. for revocation of British patent no. 533,495, owned jointly by May and Baker Ltd. and Ciba Ltd. It is understood that on behalf of the patentees notice of appeal has now been lodged.

Corrigendum.—Major-General F. Harris's name was incorrectly given in the acknowledgment at the end of Brigadier Parsons's paper last week (p. 513).

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CARCINOMA OF THE STOMACH *

HERMON TAYLOR
M.A., M.D., M.Chir. Camb., F.R.C.S.
SURGEON TO THE LONDON HOSPITAL AND TO KING GEORGE HOSPITAL, ILFORD

THE Registrar-General's reports inform us that each year more than 13,000 people in this country die from carcinoma of the stomach. What proportion of cases are referred to hospital is not known, but the 21st report of the British Empire Cancer Campaign indicates that in London 5 out of every 6 of these people are beyond cure by the time they get there. Of each 5 hopeless cases 2 have clinically recognisable metastases on arrival, 1 is generally too ill for operation, and 2 are found to be inoperable on laparotomy. The 1 patient in 6 whose growth is removed submits his life to a 30% risk, and if he survives the crisis he has half the normal expectation of life at his age. For every patient who achieves that goal 11 of his pilgrimage to hospital fall by the wayside.

In putting these facts together in the accompanying figure, I have guessed the proportion of all cases referred to hospital as 70%; whether or not this estimate is acceptable, the deduction from the facts is inescapable—that, while the hospitals devote their energy and skill to improving the lot of the small minority of cases successfully operated on, the fate of the great mass of patients with carcinoma of the stomach is little better than it was before the time of Lister and Simpson.

The British Empire Cancer Campaign's report shows that, of the small group of patients eventually submitted to gastrectomy, only a fifth were operated on within three months of the onset of symptoms and less than half within six months; there was more than twelve months' delay in a quarter of the cases, due to the fact that in about half the cases the patient did not seek advice from his doctor within three months of the onset of symptoms, and in about a third of the cases the doctor did not refer the patient at once to hospital.

The patient's delay was presumably due largely to ignorance of the possible significance of the symptoms, and there can be no doubt that education of the public in health matters of this kind would be much more effective in combating carcinoma generally than medical means alone can possibly be. One is tempted to wonder what would be the effect if each citizen on his or her fortieth birthday received some such letter as the following:

DEAR MR. X,—Congratulations on your 40th birthday! It is pleasant to reflect how much better your prospects of good health are today than they would have been forty years ago. Medicine has made great progress in your lifetime, and we want you to appreciate this in case you should fall ill. That is why we write now to tell you that you are entering the period of life when the beginnings of cancer may establish themselves in your body. This is *not* usually a painful process but may show itself in such mild ways as persistent loss of weight, of appetite, or of energy. Or you may notice a lump, or perhaps blood from one of the orifices of the body.

The point is that after forty almost any symptom which persists may be due to cancer. If people would only go at once to their doctors when they notice such a thing, they could mostly be cured. Generally they put it off and hope for the best, until the cancer has spread into vital parts and there is no hope left.

Be warned; take trouble. If you have a persistent symptom, first make sure it is not due to cancer. Ask your doctor; you will not be hurt; if your fears are groundless, he will tell you. If not, you may have the joy of cure from a condition which might well have been fatal if it had been neglected.

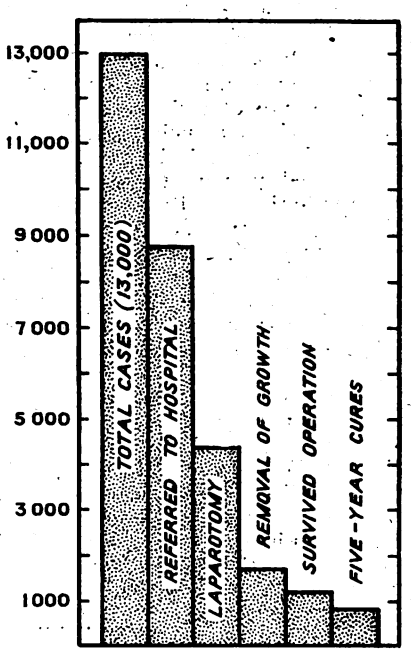
We hope you will have no need of this advice; but, if you do, consult your doctor early and give him a chance to help you. So may you enjoy many happy returns of the day.

Yours sincerely,
Minister of Health.

I am not one of those who feel that such an approach would create hypochondriacs. These we have always with us. Their troubles are founded not on knowledge but on their psychological make-up, and I do not believe that their ranks would be swelled by proper ventilation of the facts among the more robust-minded majority of the population. On the contrary, I feel that if material results are to be achieved in the cancer campaign there must be some personal and individual contact with the over-forties such as I have attempted to infuse into the letter. One can only hope that the National Health Service will seize the opportunity to instruct the public in these simple matters, and so establish itself as an instrument of real progress in medicine.

DIAGNOSIS

General practitioners tell me that a considerable proportion of their patients complain of their stomach. They are well aware that any vague dyspeptic may turn out to have carcinoma of the stomach, and would welcome any method of excluding this possibility before starting treatment. But they also realise that it would be impossible and undesirable to refer all these patients to hospital, embarrassing the consultant with general-practice work and swamping the radiological department. Moreover, their own reputations as clinicians would suffer severely; so perforce they must adopt the practice of "diagnostic therapy," whereby it is supposed that, if the treatment relieves the symptoms, these cannot be due to cancer. This conception is, of course, completely fallacious, since the symptoms are not so much those of the growth as of concomitant gastritis, stasis, anæmia, or wasting, which may often be kept under control until the cancer has become inoperable.



Approximate fate of patients with carcinoma of the stomach in England in 1938.

This raises the question: How does one diagnose early cancer of the stomach in general practice? It is all very well for the consultant to describe the symptoms and signs of an established case; to demonstrate the occult blood and (perhaps) the achlorhydria, and sign a request for an X-ray examination. It is infinitely more difficult for the doctor in general practice where these aids to diagnosis are scarcely available.

It is unusual for a lump to be palpable in the absence of metastases, and we have in effect only one reliable diagnostic method—radiology. Therefore, until the general practitioner can obtain a radiological report on all his suggestive cases, there can be no real advance.

* Read at a discussion by the Society of British Gastro-Enterologists in November, 1947.

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To achieve this there would have to be facilities for a very large number of barium meals.

ORGANISATION

There are roughly 15,000,000 people in this country between the ages of forty and sixty-five—i.e., 1,250,000 in each of the proposed health-service regions. If each year 1 in 25 of this age-group required a barium meal at the request of his general practitioner, 50,000 barium meals would be needed each year in each region. If one X-ray plant can deal with 20 barium meals a day, or 5000 a year, ten X-ray plants would be enough in each region. The provision of this equipment would not be impossible.

The service would naturally be directed by consultant radiologists holding appointments at the large hospitals, and they could decide whether to provide the additional facilities by enlarging their departments or by establishing additional regional centres. The chief difficulty would probably be the shortage of trained staff, since barium-meal work is one of the most skilled branches of radiology. The examinations could be carried out by junior radiologists in training as clinical assistants at the hospitals; they would get a wide experience of the radiology of the normal stomach and could submit any abnormal case to the radiologist in charge of the department. If this suggestion is impracticable, it would be necessary to make extended use of technicians, as in pathological laboratories. Whether such technicians could be trained to screen the stomach I am not competent to say, but they could prepare three films of each case for submission to the consulting radiologists. It will be objected that a proportion of small lesions would be missed by such a method; but as a surgeon my impression is that for every small lesion there are a great many obvious filling defects to be seen on the films. I feel sure that if every positive or doubtful case were referred for screening by the radiologist, comparatively few errors would be made.

This is obviously a controversial subject; but somehow radiology must get to closer grips with gastric carcinoma in the mass, instead of in selected cases. I have no doubt that, if the technical problem is put to them, our radiological colleagues will solve it. If the solution implies a modification of their technique of perfection, they may be assured that, in a situation where 5 out of 6 cases are lost from the start, an imperfect reform is better than none.

CONCLUSION

I do not suggest that the scheme outlined would completely solve the difficulties; there will always be cases of cancer of the stomach that are absolutely symptomless until they are inoperable, and there will always be sturdy beggars who refuse to consult a doctor. These we shall never save; but, if the general practitioners had direct radiological facilities at their call, and if the general public knew that they could be radiographed without being herded through the overcrowded outpatient departments of the hospitals, increasing numbers of patients would be referred for treatment at an operable stage.

As an operating surgeon I am appalled and depressed by the endless succession of hopeless laparotomies or desperate dissections of too extensive growths for lack of diagnostic facilities in general practice, and I see no other remedy for it. If, instead of 1 case out of every 6 that come to hospital we could save 3, no less than 3000 lives could be saved each year in this country. That is a challenge and an opportunity for the new organisation of the medical services, and an objective which fully justifies a clinical and radiological experiment on a regional scale.

STREPTOMYCIN TREATMENT OF TUBERCULOUS MENINGITIS

STREPTOMYCIN IN TUBERCULOSIS TRIALS COMMITTEE,* MEDICAL RESEARCH COUNCIL

In September, 1946, the Medical Research Council appointed a committee to plan and direct clinical trials of streptomycin in the treatment of tuberculosis. Since the amount of the drug expected to be available for the trials was limited, the committee decided to restrict the tests at the outset to a few acute and usually fatal forms of the disease, including tuberculous meningitis in children and acute miliary tuberculosis. This report, the first to be made by the committee, is concerned with the results in tuberculous meningitis.

Three main centres were established in the first instance: Hammersmith Hospital (L.C.C.); Alder Hey Children's Hospital, Liverpool; and the Royal Hospital for Sick Children, Glasgow. Later, cases were also admitted under this scheme to the Hospital for Sick Children, Great Ormond Street; Guy's Hospital; the National Hospital for Nervous Diseases, Queen Square; and Highgate Hospital (L.C.C.). At the Radcliffe Infirmary, Oxford, some cases had been treated with streptomycin before the M.R.C. scheme was begun; this centre continued during 1947 to operate under M.R.C. auspices. Finally, when pressure for admission of cases was increasing, a few cases were admitted to centres established for other tuberculosis investigations in the M.R.C. streptomycin trials. Until July, 1947, only children under 9 years of age were admitted to the centres (except at Oxford, where there was no age limit); between then and the inception in September of the Ministry of Health scheme (see below) a few older children and adults were admitted as an emergency measure. In September, 1947, the centres at Alder Hey, Glasgow, Great Ormond Street, and Guy's were absorbed into the current Ministry of Health scheme, and the two largest centres, Hammersmith and Highgate, continued investigating special problems under M.R.C. auspices.

The first patients to be treated under the M.R.C. scheme were admitted in January, 1947, and 138 cases were admitted during 1947. This report is confined to the 105 proved cases admitted before Aug. 18, and the survivors observed to Dec. 15, thus giving a minimal observation period of 120 days (17 weeks). Of the 105 proved cases, 13 were treated at Oxford and are analysed in a separate report (Smith et al. 1948). For the other 92 cases the mean observation period in the survivors was 201 days (median 191 days), the maximum 325 days; the mean potential observation period (assuming survival of all cases) was 198 days (median 175), the maximum 334 days.

The centres kept uniform records and followed general recommendations regarding dosage, but there were necessarily considerable variations, particularly in rhythm of treatment, between different centres and between cases within each centre, because knowledge regarding optimal methods was so scanty that no hard and fast rules regarding treatment could be laid down.

This report does not present an exhaustive clinical analysis of the cases. By grouping the information from all centres it is, however, believed possible to reach conclusions more significant than could be derived from a study of a relatively small number of cases at one centre alone. It is hoped that the report may be followed by fuller clinical and pathological reports from individual centres.

The purpose of the present analysis is to ascertain the survival-rate in tuberculous meningitis under streptomycin treatment, to seek optimal techniques of treatment, to establish possible guides to prognosis, and to

*Dr. GEOFFREY MARSHALL (chairman)
Prof. J. S. BLACKLOCK
Prof. CHARLES CAMERON
Prof. N. B. CAPON
Dr. ROBERT CRUICKSHANK
Prof. J. H. GADDUM
Dr. F. R. G. HEAF
Prof. A. BRADFORD HILL
Dr. L. E. HOUGHTON
Dr. J. CLIFFORD HOYLE
Prof. HAROLD RAISTRICK
Dr. J. G. SCADDING
Prof. W. H. TYTLER
Prof. G. S. WILSON
Dr. P. D'ARCY HART (secretary).

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define the main outstanding problems. The general results (table I) and the over-all results of two methods of treatment (tables V and VI) refer to the total 105 proved cases; the more detailed analysis is concerned with the 92 cases treated in centres other than Oxford.

It had already become evident in the M.R.C. tests by the early summer of 1947 that streptomycin prolongs life and, at least temporarily, restores health in some cases of tuberculous meningitis, as previously reported from the U.S.A. The council thereupon recommended to the Ministry of Health that streptomycin should be made available for this condition as widely as supplies would permit. This recommendation led to the arrangement referred to above as the "Ministry of Health scheme," under which the streptomycin treatment of tuberculous meningitis (and acute miliary tuberculosis) can now be undertaken at many hospitals throughout the country (see *Lancet* 1947).

The streptomycin used in the present trials was in the form of the hydrochloride, obtained from one American producer; it had satisfied the requirements of the American Food and Drug Administration as regards identity, potency, purity, and toxicity (immediate lethal effects on mice, content of histamine-like depressor substances, content of pyrogens, &c.); tests on random samples at the National Institute for Medical Research gave confirmatory results. The potencies of the preparations were within the range 550–650 μg. of base per mg. of material. All weights of streptomycin given here refer to active base (1 μg. of base is the equivalent of 1 S unit and of 1 provisional British unit). So far as possible each patient received the same batch throughout his treatment.

Summary of Results on Dec. 15, 1947

Of the 105 patients admitted to M.R.C. centres for streptomycin treatment before Aug. 18, 1947, 67 (64%) have died and 30 (28%) are making good progress after 120 or more days' treatment and observation (table I). The condition of those making good progress is considered below.

It soon became obvious that the prognosis in children under 3 years of age was much worse than in older children; table I shows that the proportion of older children surviving and making good progress after four months

TABLE I—RESULTS OF STREPTOMYCIN TREATMENT RELATED TO AGE

Age (yr.)	No. of cases admitted before Aug. 18, 1947	Condition on Dec. 15, 1947			
		Good	Stationary or relapsed	Deteriorating	Dead
Under 3	33	4 (12%)	0	2 (6%)	27 (82%)
3–5 ..	26	10 (38%)	2 (8%)	0	14 (54%)
6–8 ..	25	11 (44%)	3 (12%)	0	11 (44%)
9 and over	21*	5 (24%)	1 (5%)	0	15 (71%)
All ages	105	30 (28%)	6 (6%)	2 (2%)	67 (64%)

*11 at Oxford.

was more than three times that in children under 3 years. An analysis of results reported by Debré et al. (1947) also shows a high fatality-rate in young children. The results in the age-group 9 years and over are not comparable with the rest, since 12 of the 21 received intramuscular treatment alone (see below).

Space does not allow comparison of results with those reported by Hinshaw et al. (1946), Dubois and Linz (1947), Cocchi and Pasquinucci (1947), Council on Pharmacy and Chemistry (1947), and Mollaret (1948). The last is one of a symposium of twelve papers reporting on a total of 615 cases of tuberculous meningitis treated in France.

Clinical Condition of Patients on Admission

Nearly a third of the patients admitted were in a clinically advanced condition when submitted to the centres for streptomycin treatment: some cases, on the other hand, were diagnosed at a relatively early stage. To assess how far the prognosis depends on the clinical condition at the time treatment was started, the 92 cases

TABLE II—RESULTS OF STREPTOMYCIN TREATMENT RELATED TO STAGE OF DISEASE

Stage of disease at start of treatment	No. of cases admitted between Jan. 18 and Aug. 18, 1947	Condition on Dec. 15, 1947		
		Good	Stationary, relapsed, or deteriorating	Dead
Early ..	26	11 (42%)	3 (12%)	12 (46%)
Medium ..	38	10 (26%)	3 (8%)	25 (66%)
Advanced ..	28	2 (7%)	2 (7%)	24 (86%)
Total ..	92	23 (25%)	8 (9%)	61 (66%)

treated in centres other than Oxford have been classified as follows:

Early.—Patients with mainly non-specific symptoms, with little or no clinical signs of meningitis, with no pareses, in good general condition, and fully conscious. Diagnosis established mainly on findings in cerebrospinal fluid (C.S.F.).

Advanced.—Patients obviously extremely ill, deeply stuporose or cómatose, or with gross pareses.

Medium.—Patients in a condition between those of the first two groups.

A little less than half the early cases, two-thirds of the medium cases, and six-sevenths of the advanced cases have proved fatal (table II). Only 2 of 28 advanced cases are making good progress,† compared with 11 of 26 early cases. Though some early cases never responded to treatment, and 2 advanced cases did respond, on the whole the prognosis is closely related to the condition on admission.

In this analysis the stage of disease has been assessed solely on the clinical condition on admission. In general, patients with a short history suggesting meningitis were clinically at an earlier stage than others, but there were many exceptions. Thus 8 patients with a suggestive history of more than a week's duration were still at an early stage on admission; on the other hand, 7 patients with a similar history of less than four days' duration were at an advanced stage. The development of clinical illness was sometimes very rapid, particularly in young children. Indeed the bad prognosis in children under 3 years is partly explained by the fact that so many of them (18/32 as against 10/60 older patients) were at an advanced stage on admission.

The length of non-specific history (with symptoms not suggesting meningitis) bore little relation to the condition on admission. In many cases a history of symptoms suggesting meningitis merges insensibly into a much longer non-specific history corresponding to a period of primary infection, or of miliary disease without meningitis. Thus 8 early cases had non-specific histories of over a month, whereas in 14 advanced cases there was no history of illness of any kind until a fortnight before admission.

Many patients showed on admission evidence of tuberculous lesions in other parts of the body. All were radiographed shortly after admission. In 25 (27%) the chest radiogram revealed typical miliary lesions; 23 (25%) had enlarged hilar glands or a recent or apparently active primary complex without associated miliary lesions; in 12 (13%) there were other lesions in lung, bone, or skin; only 32 (35%) had no other detectable

† One of the two has serious behaviour disorders (case 30); the other (case 37) has relapsed and died since December, 1947.

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TABLE III—RESULTS RELATED TO X-RAY FINDINGS ON ADMISSION

X-ray findings	No. of cases admitted between Jan. 18 and Aug. 18, 1947	Condition on Dec. 15, 1947		
		Good	Stationary, relapsed, or deteriorating	Dead
Miliary or recent primary lesions ..	48	8 (17%)	4 (8%)	36 (75%)
Others ..	44	15 (34%)	4 (9%)	25 (57%)

lesions. Table III suggests that cases apparently caused by acute blood dissemination—i.e., those with miliary or recent primary lesions—have a higher fatality-rate.

Diagnosis

Nearly a third of the patients admitted to the centres were at an advanced stage. The proportion was much higher among the total cases submitted; at a time when beds and drug supplies were severely limited, selection necessitated refusal of cases so advanced as to offer little if any hope of response. The fact that so many were at an advanced stage when diagnosed, coupled with the finding that early cases offer the best prognosis, emphasises the importance of some features relevant to the diagnosis in the present series.

History.—The clinical history was often vague or misleading, and an early diagnosis of tuberculous meningitis could only be made by actively seeking supporting evidence.

A definite history of contact with diagnosed tuberculosis in the home was found in 35 of the 92 cases; but in three centres where it is known that a full inquiry was invariably made such a history was elicited in 23 of 42 cases (against 12/50 in other centres).

Tuberculin Reaction.—The tuberculin test has proved a highly significant aid to diagnosis, particularly in young children. It is commonly stated that the result is often negative in tuberculous meningitis, but in only 1 of 73 cases in this series with Mantoux tests completed—i.e., carried to a dilution of 1/100 where necessary—was the result negative; 5 showed positive reactions to O.T. 1/100 but not to 1/1000, and 67 to O.T. 1/1000.

Radiography.—Routine chest radiography proved another valuable aid. Of the 92 patients, 55 (60%) had tuberculous lesions in the chest demonstrable by radiography (5 more had previously diagnosed tuberculous lesions in other parts of the body).

C.S.F. Findings.—The general picture of C.S.F. changes was fairly characteristic in most cases. It is not possible from the present series to attach particular diagnostic importance to any one change in elements of the C.S.F., but a low sugar content had differential value when benign lymphocytic meningitis was in question.

All 92 cases reported here were proved either by isolating the tubercle bacillus from the C.S.F. by culture or guineapig inoculation, or by post-mortem histological examination. Cases with acid-fast bacilli in the C.S.F. smear not subsequently confirmed biologically are not included. Three survivors in whom the diagnosis is a most likely one, but in whom it was not confirmed by culture or guineapig inoculation, are excluded.

A diligent search for tubercle bacilli in the slide smears of C.S.F. deposit before the start of treatment gave positive results in 42 (46%) of the 92 cases. Direct examination of the C.S.F. smear is therefore of great value. Most patients, however, provided strong collateral evidence supporting the diagnosis; the general rule was therefore to start treatment even in the absence of immediate bacteriological proof, and the rule gradually adopted was to reserve the major part of the C.S.F. deposit for culture and guineapig inoculation, to provide later confirmation of the diagnosis and also to secure for sensitivity test specimens of the untreated strain of tubercle bacillus. The results of cultures for tubercle bacilli and guineapig inoculation of pretreatment specimens are analysed in table IV.

Guineapig inoculation was apparently more reliable than culture in those specimens of C.S.F. where acid-fast bacilli were not seen on direct examination. The difference is not statistically significant, but in addition 12 specimens, 11 of which were negative on direct examination, gave negative cultures but were positive on guineapig inoculation, whereas only 2 specimens were positive on culture but negative in guineapigs. It must, however, be emphasised that no controlled study along these lines was being made, and it is possible that where guineapigs were being inoculated only a small amount of the C.S.F. deposit was used for culture.

Only 1 of the strains from 33 cases was of bovine type, the rest being human.

Streptomycin Administration

When the first centres for streptomycin treatment of tuberculous meningitis were opened in January, 1947, little was known except that some patients treated in the U.S.A. were still alive; no detailed treatment technique could be recommended. It was decided that all cases should be treated both by the intramuscular route and intrathecally, that the intramuscular injections should be given 6-hourly for at least three months, and that frequency and total duration of intrathecal treatment should be left to the discretion of the clinician in charge. The 24-hourly intramuscular dose was to be 1 g. for children under 3 years, and 2 g. for older children; with the first few cases it became evident that this dosage was too high, particularly for children at the lower age limits, and the 24-hourly dosage adopted for the rest of the trials was 0·02 g. per lb. of body-weight. The maximal 24-hourly dose was 2 g. The intrathecal dose has been between 0·05 g. and 0·1 g.; the dose was given in 5–10 ml. of normal saline, not more often than once daily.

TABLE IV—EXAMINATION OF PRETREATMENT SPECIMENS OF C.S.F. FOR TUBERCLE BACILLI

C.S.F. findings	Cultures (85 specimens)		Guineapig inoculation (53 specimens)	
	Pos.	Neg.	Pos.	Neg.
Direct examination positive	33	3	17	2
Direct examination negative	24	25	23	11
Total ..	57	28	40	13

Toxic effects attributable to excessive dosage were seen in the first few children treated; in some of these albuminuria developed and blood and casts were found in the urine. After the dosage was reduced, toxic symptoms rarely necessitated cessation of treatment. Transient rashes which disappeared while treatment was continued were seen in 13 patients; as isolated phenomena they appear to be of little significance. In 15 cases there was a low pyrexia which persisted throughout streptomycin treatment and only disappeared after the end of the course; this was true particularly during courses of intrathecal treatment. Persistent vomiting during treatment occurred in many cases, but its frequent combination with other evidence of unsatisfactory progress made it difficult in any instance to assign responsibility to toxicity or to progressive hydrocephalus.

Tests of effects on the vestibular apparatus were too few to bear analysis; but in the survivors little subjective

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effect persisted. Children had an ataxic gait on beginning to walk, but after several weeks their gait became normal.

A disturbing feature manifest in some patients was meningeal irritation attributable to the intrathecal treatment. Thus case 78, a girl of 7 years, made a good general response in the first two weeks of treatment, though clinical signs of meningitis persisted; meningism became much more severe in the third week and persisted until after the 28th day, when intrathecal treatment was stopped; from that time she made rapid uninterrupted progress. Similarly case 29 improved dramatically after cessation of intrathecal treatment lasting seven weeks, during which period her clinical state had been stationary or deteriorating.

The irritant effect of streptomycin on the meninges was often demonstrated in the C.S.F. by a well-marked pleocytosis (predominantly polymorphonuclear); in 20 cases this reaction was seen after the first injection, with cell-counts rising as high as 3250 per c.mm. in 1 case; in 13 cases the sharp rise appeared only after several intrathecal injections had been given. In patients whose progress was favourable, after cessation of intrathecal therapy the cell-count fell steeply at first and then gradually reached a low level.

TRIAL OF INTRAMUSCULAR TREATMENT ALONE

These facts led the committee to consider whether in some cases the trauma of intrathecal injections repeated over a long period, and the irritant effect of streptomycin on the meninges, might not more than counterbalance the possible benefits of introducing the drug directly to the site of the disease. Moreover, it was found that by intramuscular injections alone streptomycin levels of 2–4 μg. and sometimes 8 μg. or more per ml.‡ could be reached in the C.S.F. in meningitis. After full discussion in June, 1947, at a meeting of clinicians of the centres concerned, it was concluded that the question could be answered only by conducting a parallel investigation with cases treated by intramuscular injection alone. Accordingly from mid-June alternate patients admitted to M.R.C. centres received streptomycin by the intramuscular route only; also the few patients over the age of 9 years admitted to centres other than those established specifically for treatment of tuberculous meningitis had intramuscular therapy only.

Including those treated in the Oxford centre, 33 of the 105 patients were treated with a course of streptomycin given intramuscularly only; 5 of these who did not respond were later given intrathecal treatment. In table v the results of combined therapy (intramuscular plus intrathecal) are compared with those of intramuscular treatment alone. The first group includes cases admitted since the start of the trials (mean potential observation period 223 days); the second, only cases admitted since mid-June, 1947 (mean potential observation period 148 days). The type of case admitted was similar in the two groups, with a similar distribution of cases in an advanced stage on admission.

‡ Levels of 2–8 μg. per ml. represent a satisfactory bacteriostatic range, according to present knowledge.

TABLE V—RESULTS RELATED TO MODE OF TREATMENT

Age	Treatment	No. of cases admitted before Aug. 18, 1947	Condition on Dec. 15, 1947		
			Good	Stationary, relapsed, or deteriorating	Dead
Under 3 yr.	Combined ..	24	4 (17%)	2 (8%)	18 (75%)
	Intramuscular only ..	9	0	0	9 (100%)
3 yr. and over	Combined ..	48	21 (44%)	3 (6%)	24 (50%)
	Intramuscular only ..	19	3 (16%)	3 (16%)	13 (68%)
	Intramuscular plus intrathecal later	5	2	0	3
All ages	Combined ..	72	25 (35%)	5 (7%)	42 (58%)
	Intramuscular only ..	28	3 (11%)	3 (11%)	22 (78%)

The results are considerably better in the series on combined therapy. About a third of these were doing well after a minimum of 120 days' observation and treatment, as compared with a ninth of those on intramuscular treatment only. The difference between the two series is statistically significant. Of the 28 patients on intramuscular treatment alone 22 (78%) died, compared with 42 (58%) of 72 patients on combined therapy. The results were particularly disastrous in children under 3 years; not one of the 9 patients on intramuscular therapy alone survived—indeed not one of them survived more than two months, whereas in 10 of the 18 fatal cases under 3 years on combined therapy life was prolonged over two months.

TABLE VI—RESULTS OF COMBINED INTRATHECAL AND INTRAMUSCULAR STREPTOMYCIN TREATMENT IN CHILDREN OF 3 YEARS AND OVER AND ADULTS

Stage of disease on admission	No. of cases admitted before Aug. 18, 1947	Condition on Dec. 15, 1947		
		Good	Stationary or relapsed	Dead
Early ..	15	9 (60%)	2 (13%)	4 (27%)
Medium ..	21	9 (43%)	1 (5%)	11 (52%)
Advanced ..	12	3 (25%)	0	9 (75%)
All stages ..	48	21 (44%)	3 (6%)	24 (50%)

The difference in results is even more definite if account is taken of the fact that the mean observation period in the group on combined therapy was longer than in the other group. Taking the results in all cases four months after treatment had been started, in the group on combined therapy 43% had died, whereas of those having only intramuscular therapy 70% had died.

The superiority of combined treatment is illustrated in another way by the 5 cases in which it was applied at a late stage following unsuccessful intramuscular treatment. Of these 5 patients 2 improved after intrathecal treatment was added, one of them responding dramatically, as follows:

Case 81.—A girl of 4 years admitted with seven days' history of headache, vomiting, and constipation, and a history of close contact with a case of open tuberculosis. Neck-rigidity, positive Kernig's sign, fully conscious but irritable, general condition fair. Mantoux positive. Chest radiogram: enlarged hilar glands, and patch of consolidation left mid-zone. C.S.F.: 75 lymphocytes per c.mm., protein 90 mg. per 100 ml., chlorides 710 mg. per 100 ml. Smear negative for tubercle bacilli (later culture positive).

The patient responded very rapidly to intramuscular streptomycin treatment; within two weeks meningeal signs and irritability had disappeared, and lymphocytes and protein content in the C.S.F. were falling. After this her clinical condition remained satisfactory for two months, though without further improvement; the only abnormal neurological sign was an extensor plantar reflex (doubtful until the fourth week), but from the end of the third week cells and protein in the C.S.F. increased progressively, reaching on the 75th day of treatment 480 cells per c.mm. and 350 mg. of protein per 100 ml. (chlorides were within normal limits). The C.S.F., negative for tubercle bacilli since the first week, showed tubercle bacilli on direct examination and on culture between the 60th and 70th days.

Henceforth the patient began slowly to deteriorate clinically, becoming apathetic and then irritable, vomiting occasionally and then repeatedly, until finally she presented a typical picture of tuberculous meningitis more severe than on admission. Intrathecal treatment was started on the 90th day.

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She continued to deteriorate for three weeks, when she suddenly began to improve and she has continued since then to make good progress. On Dec. 15, six weeks after the start of intrathecal treatment, meningism had disappeared and she was afebrile, cheerful, and sitting up out of bed. She was still having treatment, and the C.S.F. contained 256 cells per c.mm., with 692 mg. of protein and 670 mg. of chlorides per 100 ml.

This case-history is characteristic of the favourable initial response to intramuscular therapy, uncomplicated by the irritation that intrathecal therapy can produce; this type of response led to the hope in the first two months of this part of the investigation that intramuscular therapy alone might be effective. The case follows the pattern also of the late progressive deterioration observed in cases on intramuscular therapy only, and finally it demonstrates the effect of introducing streptomycin intrathecally. The 3 fatal cases to whom intrathecal streptomycin was given after a course of intramuscular treatment received it terminally, too late to be of use.

Manifestly, even though 3 patients who have had only intramuscular therapy have done well, intrathecal treatment must for the present be considered indispensable as a working rule.

With the superiority of combined therapy established, the results of this method related to the stage of disease on admission yield an interesting analysis, and the results are given in table VI (with the exclusion of patients under 3 years because of their generally bad prognosis).

It is seen that only 4 of 15 early cases have died. Taking together the cases admitted at early or medium stages, 18 out of 36 were making good progress after 120 days or more.

RHYTHM AND DURATION OF STREPTOMYCIN THERAPY

Since various modes of streptomycin treatment were adopted in different centres, an attempt has been made to see if one method was more efficacious than another.

The regimens of treatment in the 23 patients (table II) who have done well are set out in fig. 1. A first impression is confusing, for it appears that these patients were treated in very different ways: some with combined therapy maintained for nearly three months; some with continuous intramuscular treatment but interrupted courses of intrathecal treatment; and some with long rest periods in which they had no streptomycin by either route. Consideration of the 69 patients who responded less well or not at all (not charted here) reveals a similar multiplicity of techniques.

However, on analysing the results in different centres, it was found that in the centre where the least intrathecal treatment was given, and where all streptomycin treatment was interrupted frequently and for relatively long periods, the highest proportion of good results was obtained—i.e., 5 doing well and 5 deaths among 11 patients on combined therapy. By contrast, in a centre where treatment was maintained fairly continuously by both routes, 1 did well and 9 died among 10 patients on combined therapy. The age-distribution was similar in these two centres, as also was the condition of patients on admission.

The results of this comparison between the two centres are suggestive but obviously not conclusive. Note in fig. 1 the treatment given in the 5 successful cases (11, 23, 28, 38, and 69) at the first centre; one of these is of particular interest:

Case 38 is remarkable in that the patient had only 11 days' streptomycin treatment in the first two months. A boy aged 2 years, he had been ill on and off for ten days. On admission he had mild meningeal signs, and the C.S.F. contained 300 cells per c.mm. (99% lymphocytes); protein 302 mg. per 100 ml.; chlorides 652 mg. per 100 ml. His tuberculous mother had died four months previously, he was Mantoux-positive, and a chest radiogram showed enlarged hilar glands. Streptomycin treatment, started immediately, was stopped after five days because no tubercle bacilli had been seen in the C.S.F. He continued to improve, except that three weeks after admission he developed paresis of the right arm. When the culture of a pretreatment specimen of C.S.F. gave a positive result, treatment was started again on the 42nd day, but was discontinued again after five days (because he had a well-marked pyrexial reaction). He remained well and apyrexial until about the 75th day, when his general condition began to deteriorate, his temperature rose, and the lymphocyte-count and protein in the C.S.F. increased; treatment was started again on the 86th day. His condition improved slightly during the two-month treatment course that followed, and improved more still after the end of the course. On Dec. 15, 1947, his general condition was good, though he still had occasional rises in temperature to 99°F.

The general impression voiced by clinicians at the centres has been that daily intrathecal treatment sustained over a long period ceases to be beneficial and is probably harmful. Another impression that emerges is that periods of complete rest from streptomycin treatment are beneficial. The clinical evidence in favour of this is strong; some children, while improving slowly under streptomycin treatment, did not gain weight and remained pyrexial and apathetic, but during periods of suspension of all streptomycin treatment they improved dramatically.

STREPTOMYCIN LEVELS IN THE C.S.F.

Very high concentrations of streptomycin in the C.S.F. were reached by intrathecal injection. Between 1 and 3 hours after injection of 0·1 g. the level was 750–2000 μg./ml.; it fell rapidly between 4 and 10 hours after injection, and 24 hours after was in most cases between 2 and 16 μg./ml. (range 1–75 μg./ml.). High concentrations were reached also in the ventricles; in one case ventricular puncture 4 hours after injection of 0·05 g. intrathecally showed a level of 500 μg./ml. A cisternal puncture 10 min. after 0·1 g. given by the lumbar route showed a level of 1200 μg./ml.

Concentration in the C.S.F. was studied in patients who had received intramuscular treatment only, or who had not had intrathecal treatment for some weeks. An important finding is that levels varied according to the degree of disease. In the early stages of treatment the level was 3–16 μg./ml.; in patients making good progress the range was 0·125–4 μg. in 7 cases, and 8–16 μg. in 1 case only.

In patients deteriorating on intramuscular treatment only, the range of streptomycin concentration in the C.S.F. was 1–32 μg./ml.; the following 4 cases showed rising levels as the disease progressed.

Case 59 appeared to improve clinically for the first month; but the C.S.F.-streptomycin level, which was 4·3 μg./ml. on the 2nd day and fell on the 6th day to 1·6, rose again to 5·5 on the 12th day, 11·0 on the 37th day, and 20·0 μg./ml. on the 58th day.

Case 70, who clinically improved slightly in the first week and was stationary until the 90th day, subsequently deteriorating rapidly, had C.S.F.-streptomycin levels as follows: 4·6 μg./ml. on the 3rd day, 8 on the 27th, 13 on the 25th, 20 on the 47th, and 27 μg./ml. on the 58th day; the levels fell slightly subsequently when there was a spinal block.

Case 47 improved clinically during the first three months, but after this his condition remained stationary or slightly deteriorating, with a C.S.F. showing a rising cell-count and falling sugar level. The C.S.F.-streptomycin level was 0·5–1 μg./ml. in the first four days, 2–4 during the next five weeks, and 32 μg./ml. on the 57th day.

Case 81, already described, also showed a steady rise in C.S.F.-streptomycin level after the third week of treatment.

It is interesting to note also that in a case of miliary tuberculosis treated with streptomycin and developing meningitis while under treatment (case 77) the C.S.F. level was 0·125–0·25 μg./ml. before the onset of meningitis, 0·5–1·0 during the first week of meningitis, and 2 μg./ml. subsequently.

These observations provide evidence that, as the meningeal process progresses, streptomycin passes with

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increasing facility from the blood circulation into the thecal space; and conversely, as the condition improves, the barrier becomes less permeable. In other words, while a patient is on intramuscular treatment only, the C.S.F.-streptomycin level may be regarded as a valuable prognostic index, and a rising level should perhaps be an indication for a fresh course of intrathecal treatment.

In 4 patients blood and urine levels were studied after intrathecal injection of 0·1 g. The level in the blood-serum was 2–4 μg./ml. after an hour, and 4–16 μg./ml. after 4 hours. The maximal urinary excretion occurred from 1 to 12 hours after injection; $^1/_4$–$^1/_2$ the dose injected was recovered in the urine in 24 hours. The conclusion seems to be that, if intramuscular injections are spaced out to a 12-hourly or 24-hourly rhythm, intrathecal injections should be given not at the same time but in the middle of the period between one intramuscular injection and the next, since the streptomycin given intrathecally helps to maintain a good blood-serum level.

Clinical Course of Tuberculous Meningitis under Streptomycin Treatment

It has already been indicated that streptomycin is the first drug known to have modified the course of tuberculous meningitis, hitherto almost invariably fatal. What amounts practically to a new form of the disease, chronic tuberculous meningitis, is now being observed. A study of the various types of clinical response to streptomycin treatment may help us to understand this new form and its complications, and lead to a consideration of the elements of prognosis and possibly to an improvement in treatment techniques. It is possible also that whatever emerges from this study may apply also to other more potent chemotherapeutic agents that may be discovered in the future.

A—FATAL CASES

Of the 92 patients 61 have died. In many of the fatal cases survival was prolonged far beyond the period normally expected. The different types of response to treatment are discussed below.

(1) *No response to treatment.*—Twenty patients deteriorated rapidly and died within the period expected for untreated cases, without showing any response to treatment. Of these, 12 were under the age of 3 years; 15 were at an advanced stage on admission; and 11 died within five days of admission.

(2) *Slow progressive deterioration, with no period of improvement.*—In 19 cases the effect of streptomycin treatment seems to have been to delay death, sometimes for a considerable period (over four months in 2 cases) but without effecting any clinical improvement. In some of these the temperature fell after treatment was begun and tubercle bacilli could no longer be isolated from the C.S.F. In at least 2 instances (cases 27 and 72) the clinical impression was that the tuberculous infection was more or less under control, but that the patient went steadily downhill with progressive hydrocephalus. In case 27, a child of $2^1/_2$ years, on the 70th day of treatment the C.S.F. chlorides were within normal limits, protein 80 mg. per 100 ml., cells 30 per c.mm.; on the 120th day chlorides were normal, protein as before, cells 5 per c.mm. No tubercle bacilli had been isolated from the C.S.F. at any time during treatment. Miliary lesions in the lungs, obvious on admission, had cleared radiographically on the 110th day. Clinically, however, the child was in a "terminal state" two weeks after admission, and continued to deteriorate slowly. Necropsy revealed gross distension of all four ventricles.

In other cases to a picture of continuing gross infection was added one of increasing hydrocephalus, with or without manifest spinal block.

Case 82, not included in the above figure of 19 cases, improved slightly from the 60th to 80th day, during a

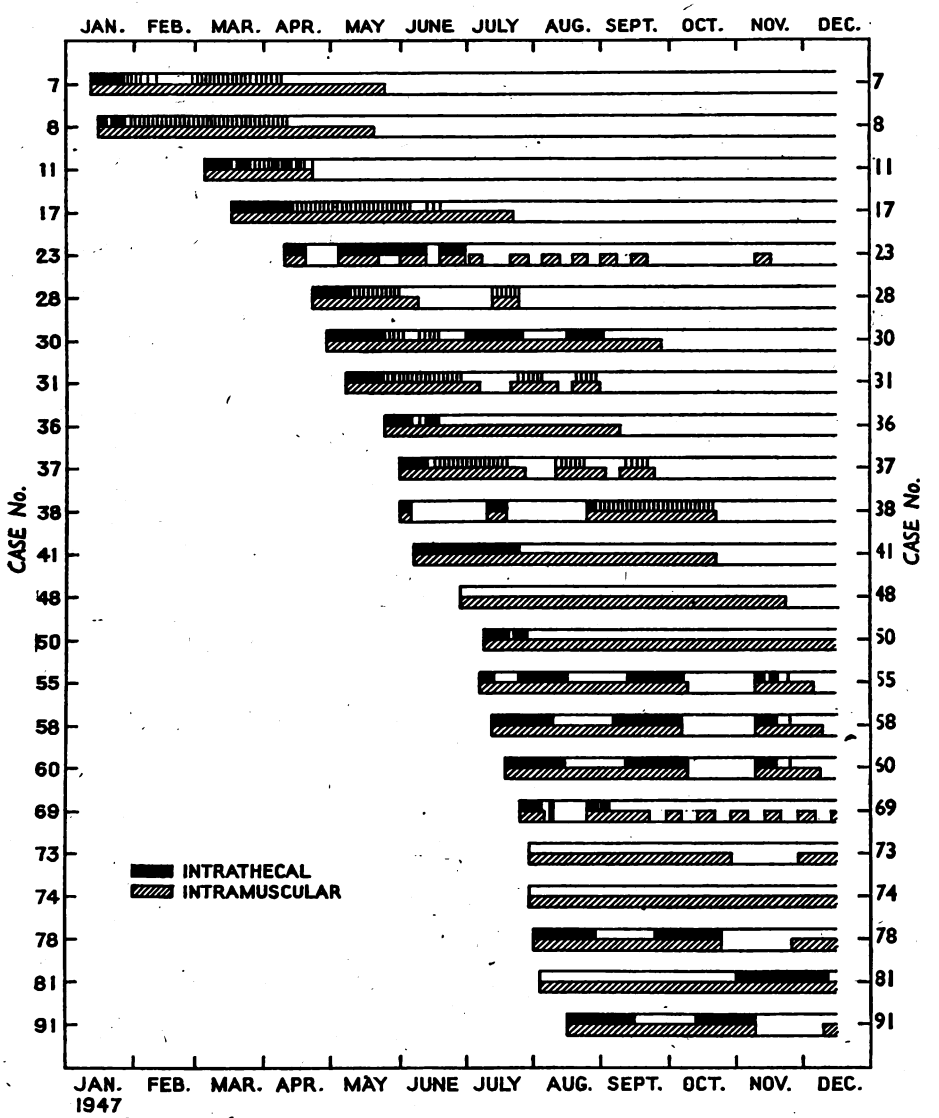

Fig. 1—Streptomycin treatment in 23 cases making good progress on Dec. 15, 1947.

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second course of intrathecal treatment. Miliary lesions in the lungs cleared radiologically. She too developed spinal block with hydrocephalus.

(3) *Progressive deterioration after short initial period of improvement or no change.*—In 9 cases there was an obvious favourable reaction during a short initial period of treatment, but this was followed by progressive deterioration terminating in death.

Case 92.—A boy of 5 years responded well at first to intramuscular treatment alone. Clinically he was improving for the first two or three weeks; his temperature fell rapidly to normal limits, tubercle bacilli disappeared from the C.S.F., and the cell-count was lowered. In the third week he began to vomit, then slowly to lose weight; his pupils became dilated, and bilateral severe papilloedema was seen, with an area of venous hæmorrhage. A diagnosis of internal hydrocephalus was confirmed by ventricular puncture, and the child went rapidly downhill and died on the 44th day; intrathecal treatment initiated on the 30th day had no effect.

(4) *Relapse after long period of improvement.*—This group of 12 cases is differentiated from the preceding group in that here the improvement gave good grounds for believing that the patient might recover; the subsequent deterioration may therefore be termed a relapse. This is a most important series to consider, since the prognosis in cases responding well is severely limited by the possibility of such relapses.

(*a*) In a first subgroup of 7 cases the relapse occurred more or less suddenly, 130, 110, 110, 75, 77, 198, 150 days after the start of treatment. The first 5 were still having intramuscular therapy when relapse was observed, one of them having intrathecal therapy also; the other 2 had been off all treatment for 16 and 88 days. In 5 of them the temperature had been within normal limits for some time before the relapse—for 80, 30, 90, and 50 days in 4 of them, while in the 5th it had been normal since admission. In 3 of them the C.S.F., though not normal, had appeared to be progressing towards normal; in the 4 others the C.S.F. had remained grossly abnormal.

Case 40.—A boy of 6 years, admitted with early meningeal signs and bilateral papilloedema, drowsy but coöperative, responded slowly to treatment and then more definitely after streptomycin treatment had been stopped on the 63rd day because of persistent vomiting. The temperature was normal from the 60th day onwards. Spinal block had developed between the 20th and 40th day and persisted until after the 80th day, when it appeared to resolve gradually. The C.S.F. cell-count had fallen progressively after cessation of intrathecal therapy on the 27th day. On the 150th day, after a long period of continuous improvement with only occasional vomiting, he suddenly began to deteriorate, with evidence of acute hydrocephalus, and died 15 days later.

Case 44.—A man of 21 years developed meningitis while in hospital with acute miliary tuberculosis. He was admitted to a streptomycin centre and treated by the intramuscular route only. His clinical condition improved rapidly, though mild meningeal signs persisted; the temperature was down to normal on the 25th day, chlorides in the C.S.F. rose to nearly normal levels, proteins varied between 80 and 100 mg. per 100 ml., tubercle bacilli were no longer isolated from the C.S.F. On the 75th day the miliary lesions in the lungs had almost completely cleared. At this time, however, he began to deteriorate, vomiting daily and complaining of intense headache; his C.S.F. pressure was high, there was bilateral papilloedema, and he died on the 96th day.

Case 21.—A girl of $7\frac{1}{2}$ years, an early case when admitted, appeared to respond well to treatment within 3 days. Meningeal signs gradually disappeared, she became mentally quite alert, and in the fourth month was up and able to walk a little. The C.S.F., however, remained grossly abnormal, with chlorides persisting below 600 mg. per 100 ml., protein 200–400 mg. per 100 ml., and cells up to 870 per c.mm. during intrathecal therapy but also reaching 340 per c.mm. when intrathecal treatment had been stopped. On the 110th day she began to vomit, and from that date she deteriorated rapidly, became drowsy and confused, wasting increased, she developed convulsions with gross vasomotor disturbance, and died on the 125th day. At necropsy all ventricles were grossly distended, and the right vertebral artery was thrombosed.

(*b*) In a second group of 5 cases, deterioration after a period of improvement was more slow and progressive. In 4 of these the clinical relapse occurred between the 30th and 50th days after start of treatment; all 4 were still under treatment at the time, 2 of them having intramuscular therapy only. In 1 patient the relapse occurred on the 130th day, when he had been off all treatment for 33 days; this was the only case in which the C.S.F. elements were nearing normal at the time of relapse.

B—CASES MAKING GOOD PROGRESS

On Dec. 15 23 of 92 patients were reported to be making good progress. Fig. 1 shows the treatment in these cases, the date of admission, and the total observation time since admission and since treatment ceased (where applicable). Table VII shows the main features of the condition of each patient as reported in December, 1947; in 9 of the 23 the C.S.F. contained less than 15 cells per c.mm., and the fluid was in other respects normal or nearly normal. In some cases improvement was continuous from the start of treatment; in others a more uneven course was followed.

(1) *Uninterrupted improvement* was observed in 12 cases (nos. 7, 8, 17, 23, 31, 37, 58, 60, 69, 73, 74, 78). The following are representative case-records:

Case 7.—A girl of 6 years, treated in hospital for a tuberculous ischial lesion, became at the beginning of February morose and apathetic; a few days later she had definite meningeal signs. On admission to a streptomycin centre she was delirious and had well-marked meningism and a characteristic C:S.F. For three days after treatment started there was little change, but after this she responded dramatically. Meningism rapidly disappeared, within a week she was lucid and well oriented, and there was a substantial reduction in the discharge of a labial sinus from the bone lesion. Papilloedema resolved during the first three months. Spinal block developed at the end of the first month of treatment, and was present for some two months, but subsequently resolved. The C.S.F. cell-count remained high until the end of the third month of treatment and then gradually fell. Clinically she continued to improve steadily. On the 205th day after treatment started the C.S.F. contained 15 cells per c.mm., protein 100 mg. per 100 ml., chlorides 760 mg. per 100 ml. In September she was transferred to another hospital for convalescence and for treatment of her bone lesion. In December she was reported to be in good general condition, apyrexial for the past month. She was still in bed, in a spinal frame for treatment of her ischial lesion; the labial sinus was discharging slightly; a radiogram showed healing round the bone cavity. On psychometric tests she was of normal intelligence, alert, and coöperative.

Case 74.—A girl of 7 years is one of the 3 cases which have responded well to intramuscular treatment alone. She was admitted to a streptomycin centre in July, very ill, toxic, with well-marked symptoms and signs of meningitis; she had been under observation for miliary tuberculosis at home for a month; the C.S.F. was characteristic. Within two weeks of starting treatment all meningeal signs apart from slight neck-rigidity had disappeared, and the child was now fully conscious and alert. The C.S.F. cell-count continued to rise until the 45th day of treatment and then fell progressively. The protein level followed a similar course. Her condition continued slowly to improve, though a low-grade pyrexia persisted. At the end of three months the miliary lung opacities had almost subsided; the primary lung focus and enlarged paratracheal gland shadows were unchanged. In December her condition was reported to be good; she was bright and rational; C.S.F. examination showed 7 lymphocytes per c.mm., protein 30 mg. per 100 ml., chlorides 716 mg. per 100 ml. A slight pyrexia and tachycardia were attributed to the primary tuberculous process still obvious.

(2) *Continuous improvement after initial stationary or deteriorating period* was observed in 8 cases. Of these, 4 cases (nos. 28, 41, 48, and 91) improved after an initial stationary period of 60, 30, 15, and 15 days; whereas 4 others (nos. 30, 36, 50, and 55) improved after at first

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appearing clinically to be deteriorating for 45, 50, 21, and 42 days.

Case 41.—A girl of 3½ years, undergoing treatment for lupus, became listless at the end of May, and a few days later developed signs of meningeal irritation. The C.S.F. contained 350 cells per c.mm., protein 100 mg. per 100 ml., chlorides 660 mg. per 100 ml. On admission to a streptomycin centre she was listless. During the whole of the first month of treatment there was little change clinically; she became rather less drowsy but more irritable and she developed an ocular paralysis. The C.S.F. protein remained for 50 days at a level of about 200 mg. per 100 ml., the chlorides about 600 mg. per 100 ml., and the cell-count high. Subsequently she improved steadily, the ocular paralysis regressed, she became steadily less irritable and brighter, fever subsided, and the C.S.F. elements slowly reverted to normal. She was discharged home at the beginning of November, and readmitted in December for review. She was then very well, active, gaining weight, afebrile, and mentally normal; the old lupus had healed; C.S.F. (Dec. 9): 9 lymphocytes per c.mm., protein 20 mg. per 100 ml., and chlorides 750 mg. per 100 ml.

Case 50.—A boy of 2 years, with 10 days' history of irritability, vomiting, and pyrexia, and a story of family contact, had clinical signs of meningitis, was Mantoux-positive, and the C.S.F. contained 130 cells (90% lymphocytes) per c.mm., protein 90 mg. per 100 ml., chlorides 660 mg. per 100 ml., and culture proved positive for tubercle bacilli after four weeks. During the first three weeks of treatment, while he was having intrathecal injections, he deteriorated rapidly, became semi-comatose, with increased meningism, and apparently blind, with pupils widely dilated and a sluggish reaction to light. He then suddenly began to improve, meningeal signs

TABLE VII—ANALYSIS OF 23 CASES MAKING GOOD PROGRESS ON DEC. 15, 1947

Case no.	Age (yr.)	Days of observation since treatment began	Treatment status	General condition	Temperature	C.S.F. (most recent specimen)					Comments
						Date	Cells per c.mm.	Chlorides (mg. per 100 ml.)	Protein (mg. per 100 ml.)	Sugar (mg. per 100 ml.)	
7	7	306	Nil for 171 days	Good	Normal	Sept. 4, 1947	15	760	100	..	See text
8	3	302	„ 177 „	Good	Normal	Aug. 8, 1947	2	780	30	..	Persistent slight squint. At home. Excellent progress
11	6	289	„ 242 „	Good	Normal	Nov. 15, 1947	81	724	112	..	See text
17	1	276	„ 151 „	Good	Normal	Jan. 8, 1948	40	740	140	"Normal"	Deaf. Resolving bronchopneumonia. Still in hospital
23	3	252	„ 27 „	Good	Normal	Nov. 17, 1947	13	745	40	..	In convalescent home. Excellent progress
28	6	239	„ 147 „	Good	Normal	Oct. 3, 1947	78	657	87	..	Enlarged hilar glands. Behaviour problems. In hospital
30	8	231	„ 76 „	Good	Normal	Jan. 1, 1948	12	740	60	50	Sensory aphasia, and serious behaviour disorders. In convalescent home
31	5	221	„ 106 „	Fair	Normal	Sept. 24, 1947	..	720	90	..	Slow progress. Has had whooping-cough. In convalescent home
36	7	205	„ 100 „	Good	Normal	Aug. 28, 1947	28	627	5830	..	Absent knee-jerks. At home. Steady improvement
37	4	198	„ 83 „	Good	Normal	Dec. 3, 1947	2	725	35	61	Miliary shadows cleared, hilar glands smaller. In convalescent home
38	2	198	„ 56 „	Good	Occasional 99°	Oct. 19, 1947	90	740	60	..	See text
41	3	195	„ 60 „	Good	Normal	Dec. 9, 1947	9	750	20	..	See text
48	3	172	„ 22 „	Good	Normal	Nov. 22, 1947	55	729	73	..	Mild behaviour disorders. Still in hospital
50	2	161	Still under treatment	Good	Normal	Dec. 16, 1947	6	710	40	..	See text
55	4	164	„	Good	Normal	Dec. 1, 1947	85	725	250	..	Deaf. Miliary shadows clearing. In hospital
58	7	156	„	Good	Still pyrexial	Dec. 1, 1947	400	645	500	..	Slight squint. In hospital
60	5	151	„	Good	Normal	Dec. 1, 1947	46	690	200	..	Absent knee-jerks. Miliary shadows clearing. In hospital
69	5	141	„	Good	Normal	Dec. 15, 1947	12	692	68	..	In hospital
73	8	140	„	Good	Normal	Dec. 22, 1947	8	735	60	..	Excellent progress. In hospital
74	7	140	„	Good	Low pyrexia	Dec. 18, 1947	7	716	30	..	See text
78	7	138	„	Good	Normal	Dec. 15, 1947	26	750	30	..	In hospital
81	4	135	„	Fair	Still pyrexial	Dec. 23, 1947	256	670	692	..	See text
91	6	120	„	Good	Normal	Dec. 30, 1947	94	735	80	..	In hospital

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disappeared, vision returned, and a week later he was alert, bright, and fully conscious. From that time onward he improved steadily, and in December was gaining weight, afebrile since October, continent, and with no abnormal physical signs, and optic discs normal; the C.S.F. contained 6 lymphocytes per c.mm., protein 40 mg. per 100 ml., and chlorides 710 mg. per 100 ml. He was reported to be mentally normal, intelligent, vivacious, with only behaviour problems attributable to long stay in hospital.

(3) *Improvement after relapse.*—Case 81, who relapsed on the 75th day of intramuscular treatment and began to improve again on combined therapy, has already been described. In 2 other cases the word "relapse" is perhaps excessive.

Case 11.—A boy of 6 years began to improve clinically shortly after start of treatment. Spinal block began on the 6th day and became complete on the 10th day. Fluid was freely obtained by cisternal puncture for 18 days; the ventricles were then tapped, and streptomycin was administered by that route until the 49th day, when all streptomycin treatment was discontinued. During this time he had remained clinically well until the 40th day, but from that time and for about three weeks he was more ill and disoriented, and crying was more "cephalic" in character. From the 60th day onwards he improved steadily, and from the 85th day he was afebrile and the spinal block resolved. On Dec. 15 he was very well, "wildly active," afebrile, and completely continent of urine and fæces; vision was 6/36, 6/36, and fundi still showed blurring of disc margins; the C.S.F. (Nov. 15) was under low pressure, and contained 81 cells (all lymphocytes) per c.mm., protein 112 mg. per 100 ml., chlorides 724 mg. per 100 ml. On psychological examination he was reported as "mildly elated and showing obsessive compulsive thinking; improving."

Case 38.—A boy of 2 years, who had made good progress with very little treatment but began to deteriorate on the 75th day, has already been described. In December he was reported to be very well, increasingly active, standing and moving about in a play-pen, using his right arm much more, though paresis of the forearm and hand persisted. He was, however, still totally incontinent, and reported to have a severe intellectual defect, probably permanent. The C.S.F. had not been examined since Oct. 19, at the end of a course of combined therapy; it then contained 90 cells per c.mm., protein 60 mg. per 100 ml., and chlorides 740 mg. per 100 ml.

In only 1 (case 38) of the 23 patients was intelligence seriously affected; 2 others (cases 17 and 37) were reported to be slightly below normal. Serious behaviour disorders, indicating possibly permanent damage, developed in 1 patient (case 30), who was at an advanced stage on admission; 2 other patients (cases 11 and 28) presented behaviour disorders which were improving; in 3 others mild problems arose which were attributable to prolonged stay in hospital.

C—OTHER CASES

After a long period of deterioration, 3 patients were in December in a more or less stationary condition, with evidence of gross cerebral lesions. The following case-record is typical:

Case 42.—A boy of $2\frac{1}{2}$ years was comatose on admission in June, 1947, and had a right hemiplegia. His clinical condition continued to deteriorate under treatment, but the temperature gradually fell and the elements of the C.S.F. slowly reverted towards normal, particularly after cessation of treatment on the 65th day. On the 95th day the C.S.F. contained 10 cells per c.mm., protein 30 mg. per 100 ml., and chlorides 720 mg. per 100 ml. He remained comatose, with generalised rigidity and bilateral optic atrophy, and was in this state in December. The impression was that the meningeal infection had been controlled, and the child was surviving with gross residual lesions.

In a similar case an impression of severe internal hydrocephalus was confirmed by needling; the cortex was about 0·5 cm. thick.

In 5 other cases the patients were in a condition of uncertain progress at the time of reporting, 4 of them having recently relapsed; 3 of the 5 had had intramuscular treatment only. Relapse occurred in the 4 cases after periods of improvement lasting 150, 150, 140, 135 days. The last 2, treated intramuscularly only, had been off treatment for 45 and 15 days. The 2 cases on combined therapy are particularly important:

Case 29.—A girl of 5 years, when admitted with a history of about 12 days' illness, was drowsy and had a bilateral 6th-nerve palsy, with dilated pupils reacting poorly to light; the C.S.F. was typical of tuberculous meningitis. Her condition remained stationary during the first month of treatment. She developed bilateral optic atrophy and remained completely blind subsequently. From the 30th to 40th day there was definite deterioration, with onset of left flaccid hemiplegia and pronounced mental apathy. After the end of the first course of intrathecal treatment she improved remarkably, fever subsided, elements of the C.S.F. reverted towards normal, and she began to gain weight and was mentally bright and rational. Treatment was stopped on the 115th day. On the 150th day she was walking with minimal support, and on the 175th day the left hemiplegia had regressed almost entirely. Her C.S.F. then contained 40 cells per c.mm., protein 80 mg. per 100 ml., and chlorides 730 mg. per 100 ml. She was sent to another hospital for convalescence apparently very well, but was readmitted two weeks later with headache, vomiting, and drowsiness; the C.S.F. then contained 78 cells (87% lymphocytes) per c.mm., protein 110 mg. per 100 ml., chlorides 710 mg. per 100 ml., and sugar 62 mg. per 100 ml., and an acid-fast bacillus was seen on examination of the deposit (guineapig inoculated developed tuberculosis). Intrathecal and intramuscular treatment was resumed. During the following month the C.S.F.-protein level rose, and the sugar level fell progressively. Her general condition improved slightly, but she continued to vomit and had persistent headache. The clinical impression was that the child had a communicating hydrocephalus.

Case 53.—A boy of 7 years had a history of headache and vomiting for $2\frac{1}{2}$ weeks but was at an "early" stage of disease on admission, with mild meningism, no pareses, and full consciousness. He responded well to treatment, particularly after the first month; meningeal signs had then disappeared, and he was bright, coöperative, and gaining weight. In the C.S.F. there had been a well-marked cellular response to streptomycin treatment, but the cell-count fell slowly when intrathecal treatment was stopped; C.S.F.-protein level, however, rose slowly and was 240 mg. per 100 ml. on the 75th day. The temperature fell progressively and was almost normal, with occasionally 99°F, from the 80th day. Treatment was stopped on the 95th day. He continued to improve, physically and mentally, and at the time of transfer to a sanatorium on the 150th day was clinically well apart from a slight persistent tachycardia. His C.S.F. then contained 48 cells (85% lymphocytes) per c.mm., protein 95 mg. per 100 ml., chlorides 710 mg. per 100 ml., and sugar 37 mg. per 100 ml. On Dec. 6, the 160th day, he was readmitted from sanatorium, with drowsiness, headache, vomiting, and photophobia, and with clinical signs of meningitis. The C.S.F. now contained 244 cells (83% lymphocytes) per c.mm., protein 140 mg. per 100 ml., chlorides 690 mg. per 100 ml., and sugar 24 mg. per 100 ml.

One patient, in a condition reported as stationary in December, must be considered apart from the 4 patients who relapsed:

Case 77.—A girl of 6 years was admitted to a streptomycin centre for treatment for acute miliary tuberculosis of the lungs. Her temperature fell rapidly, but on the 18th day it rose again and she became rather irritable, though otherwise apparently well; lumbar puncture was then performed for the first time, and the C.S.F. contained 75 cells per c.mm., protein 40 mg. per 100 ml., and chlorides 700 mg. per 100 ml.; tubercle bacilli were seen on direct examination and later on culture. Intramuscular injections were continued, without additional intrathecal therapy. Clinically the child continued to be very well, without signs of meningitis; she became much less irritable and gained weight, and her temperature slowly fell to normal. Tubercle bacilli were cultured several times from the C.S.F. during the first two weeks after onset of meningitis but not subsequently; the C.S.F. cell-count rose to 260 per c.mm. on the 10th day of meningitis, then fell slightly and varied subsequently between 100 and 200 per c.mm.; the protein level rose slowly. On the 90th day of meningitis she was still gaining weight and was afebrile; the

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C.S.F. contained 69 cells (94% lymphocytes) per c.mm., protein 120 mg. per 100 ml., chlorides 790 mg. per 100 ml., and sugar 32 mg. per 100 ml. On Dec. 12, the 135th day of meningitis, her general condition was unchanged and she was still afebrile, but the C.S.F. now contained 163 cells per c.mm., protein 160 mg. per 100 ml., chlorides 715 mg. per 100 ml., and sugar 15 mg. per 100 ml. She was still having intramuscular treatment only.

D—SPECIAL FEATURES

In most patients life was prolonged by streptomycin therapy; over the longer course of the disease certain complications were observed with a frequency much greater than in the untreated rapidly progressive disease, and relapses were observed in cases that had been improving.

Spinal block was diagnosed clinically in 20 of the 92 cases. It developed at different stages of the disease—sometimes within a few days of admission, sometimes as long as one or two months after treatment started. It developed in 5 of 30 patients on intramuscular therapy only, in 14 of 61 on "combined" therapy, and in 1 patient two weeks after start of intrathecal therapy following a long course of intramuscular therapy alone. The block appeared to resolve spontaneously in 4 patients: 2 of these (cases 7 and 11) made satisfactory progress subsequently; the other 2 died. In another patient making good progress in December (case 58) the spinal block appeared to be resolving. Another patient who did well (case 36) still had a definite block when the C.S.F. was last examined in September, 1947.

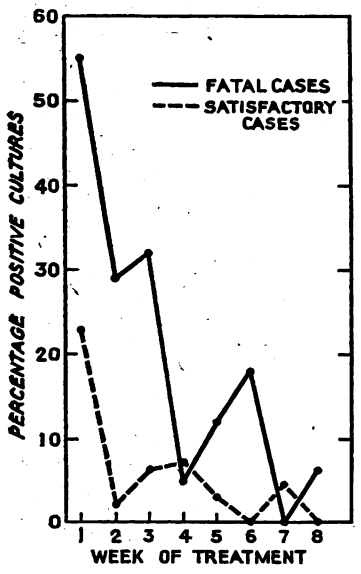

Fig. 2—Results of culture of C.S.F. for tubercle bacilli

In 7 cases streptomycin was administered by the cisternal or ventricular routes after the diagnosis of spinal block had been established. All were severely ill at the time; 6 of the 7 died within 18 days of start of treatment by these routes; case 11 responded well, and his spinal block resolved several weeks after cessation of treatment. In an 8th patient (case 36 mentioned above) cisternal puncture was performed once, but owing to the severe clinical reaction produced it was not repeated.

Clinical relapse is considered to have taken place when deterioration occurred after a period of continuous good progress lasting at least a month. The clinical histories of several patients who relapsed have already been given. Clinical relapse had been observed in 17 cases before Dec. 15: 11 among the 61 on "combined" therapy, and 6 among the 31 on intramuscular treatment only. In 5 of these cases miliary lesions were present in the lungs on admission; 8 had other probably active lesions in the chest; and only 4 had no other tuberculous lesions diagnosed on admission. 4 were under 3 years of age, 10 were aged 3–7 years, and 3 were adults (all 3 on intramuscular treatment only).

In 7 patients the relapse occurred between the 30th and 75th days after starting treatment; in 6 between the 110th and 140th days; and in 4 between the 150th and 198th days. In 8 patients the temperature had been normal for six to twelve weeks when the clinical relapse occurred. In 9 patients the clinical deterioration was more or less sudden; vomiting was the most frequent heralding symptom, followed by character changes, irritability, and apathy. In the 8 other cases deterioration was slow, insidious, and preceded by a stage during which the clinical condition seemed stationary.

In none had the C.S.F. elements returned to normal before relapse occurred, but in 7 there had been a steady progression towards normal until the time of relapse.

A study of C.S.F. changes in the period immediately preceding clinical relapse has revealed fewer factors of prognostic value than expected. Fall in the chloride level was usually the last element to reflect deterioration and in some cases did not occur at all. A sudden steep rise in the protein level usually indicated onset of spinal block, but in several cases this occurred without clinical deterioration; a slow and less pronounced rise was more significant of impending relapse, but the protein level rose slowly during the first stages of treatment in many cases, including those who did well; and, on the other hand, relapse occurred in some cases with a normal protein level. Changes in the C.S.F.-sugar level were more significant, for in 3 cases (nos. 26, 47, and 53) the level fell progressively before clinical relapse was obvious (in many cases the sugar level was not tested). The lymphocyte-count in the C.S.F. in some cases reflected progression of the disease, though in only 2 cases was a rising lymphocyte-count detected before progression was diagnosed clinically. The clearest premonitory evidence of relapse was provided, in cases recently on intramuscular treatment only, by a rising streptomycin level in the C.S.F. (see above).

Bacteriology during Streptomycin Treatment

CULTURES

In 81 of the 92 cases tubercle bacilli were isolated from the C.S.F. by culture or guineapig inoculation before treatment, during treatment, or at necropsy. In 5 other cases (all fatal) acid-fast bacilli were seen in films of the deposit at some stage; diagnosis was confirmed post mortem. In 6 cases (all fatal) no bacteriological confirmation was obtained at any time.

TABLE VIII—RESULTS OF CULTURE OF C.S.F. FOR TUBERCLE BACILLI IN 23 SATISFACTORY CASES COMPARED WITH THOSE IN FIRST 23 FATAL CASES SURVIVING A MONTH OR MORE

Week	In 23 satisfactory cases		In 23 fatal cases	
	Total cultures	Positive	Total cultures	Positive
1	43	10	58	29
2	46	1	35	10
3	47	3	37	12
4	28	2	20	1
5	29	3	24	3
6	20	0	17	3
7	22	1	13	0
8	17	0	16	1

In every case many samples of C.S.F. were cultured for tubercle bacilli during the course of treatment. Many positive results were obtained, but the frequency of positive cultures was much lower among the group of 23 patients making good progress than among those who died. In the group doing well 16 gave positive cultures at some stage during treatment, but in 12 it was only one isolated positive out of many samples during the whole course; of the remaining 4, 2 deteriorated during the first six weeks of treatment, and each had three positive cultures between the 2nd and 16th days, after which all cultures were negative; 1 patient, who was on intramuscular therapy only for 90 days and began to deterio-

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rate clinically after the 70th day, improving again only after intrathecal treatment was started, had positive cultures on the 4th and 67th days; the 4th case had positive cultures on the 18th and 29th days. By contrast, 34 of the 40 fatal cases surviving for over a month had positive cultures at some time during treatment, and of these 16 had at least three and many had a very large number of positive cultures. There is a definite difference in the first three weeks; this is shown in table VIII and fig. 2, where the number of positive cultures obtained per week of treatment from the 23 satisfactory cases has been compared with those from the first 23 fatal cases who survived for a month or more. If the figures for the first three weeks are added together, from the satisfactory cases 10% of all cultures are positive in contrast to 39% of positive cultures among the fatal cases. Considering fatal cases only, during this period 1 case had eleven positive cultures, 2 cases had ten, 1 had six, 2 had five, 1 had four, and 2 had three such cultures.

Though in cases on intramuscular therapy alone the streptomycin level in the C.S.F. is relatively low, there is no evidence that in these cases tubercle bacilli are isolated more easily from the C.S.F. In fact all those cases showing very large numbers of positive cultures were having intrathecal injections; but, against this, fewer samples were tested from cases on intramuscular treatment alone.

While it is true that in patients who initially or subsequently responded badly tubercle bacilli were often isolated in the first weeks, it is also true that in a majority of all cases surviving more than three weeks the C.S.F. became free from tubercle bacilli for long periods. The action of streptomycin on the tuberculous infection was in this respect striking, leading to the conclusion that other factors, such as hydrocephalus and arterial damage, were at least partly responsible for subsequent deterioration.

STREPTOMYCIN SENSITIVITY

As many strains as possible were tested for sensitivity to streptomycin, both initially and during the course of treatment. The method used consisted of serial twofold dilutions in Dubos' Tween albumin liquid medium (Dubos and Davis 1946). The inoculum used was usually 0·02 ml. of a 7–10 day culture (in Dubos medium) per 3 ml. of medium. Strains isolated by culture from the C.S.F. taken from 57 patients before treatment, as well as first positive cultures from 9 further cases, were all shown to have a sensitivity to streptomycin similar to that of the standard culture, H37Rv (0·25–0·5 μg./ml.).

Tubercle bacilli were isolated from the C.S.F. taken from 32 patients after the 28th day of treatment. From 22 of these patients strains isolated between the 29th and 136th days of treatment were tested; and from 19 of the 22 patients strains were found to be as sensitive to streptomycin as the initially isolated strains; in 12 of the 19 patients strains were isolated after the end of the second month of treatment.

Resistant strains were isolated from 3 of the 22 patients. One patient yielded a culture on the 87th day which showed a tenfold increase in resistance and on the 109th day one which showed a twentyfold increase. From 2 cases cultures isolated from specimens taken on the 45th and 90th days were not inhibited by 1000 μg./ml. of streptomycin. All these 3 patients died and all had miliary tuberculosis of the lungs as well as meningitis.

The patient from whom a slightly streptomycin-resistant strain was isolated yielded ten positive cultures from the C.S.F. in the first 17 days of treatment, then between the 18th and 86th days all cultures were negative. Throughout these three months the patient improved steadily. At the beginning of the fourth month the child relapsed, and five specimens of C.S.F. taken on the 87th, 92nd, 109th, 117th, and 118th days all yielded positive cultures. One of the two patients with grossly resistant strains died after three and a half months' treatment, and tubercle bacilli were isolated post mortem from a miliary lesion of lung, a caseous gland, spleen, liver, kidney, and epididymis. All these cultures showed a similar increase in resistance to streptomycin.

Necropsy Findings

Necropsies were made in 53 cases: 13 of the patients had died within a week of starting treatment, and 7 more before the end of four weeks; 14 had died between the 28th and 56th days, 11 during the third and fourth months, and 8 after more than four months.

CENTRAL NERVOUS SYSTEM

In patients dying early in the disease the usual widespread tuberculous meningitis affecting the base of the brain and the spinal cord was seen. All cases showed evidence of basal meningitis most pronounced in the region of the interpeduncular fossa. In most cases the posterior portion of the basal cistern appeared relatively free from exudate, so it seems probable that the blockage of the anterior half or two-thirds of the basal cistern by inflammatory exudate was largely responsible for the hydrocephalus, often extreme, present in nearly all cases surviving for more than a week. The hydrocephalus was in most cases of the communicating type. The pathology of the arteritis seen was essentially similar to that seen in untreated cases, though the degree of occlusion was extreme in some patients who had survived for a few months.

The trial brought to the notice of pathologists some less familiar features of the disease, which in any case were rendered more striking since, owing to prolongation of life, many of the tuberculous processes were seen in a chronic and unusual form. One such lesion was gross thickening of the spinal leptomeninges by tuberculous granulation tissue. Acid-fast bacilli were not always sought in films; but where they were the number found ranged from none to enormous numbers, the number apparently bearing no relationship to the duration of treatment.

The 13 cases which were fatal within a week of starting treatment all had the characteristic lesions of acute tuberculous meningitis; 7 showed evidence of hydrocephalus.

The 7 cases in which death occurred between one and four weeks after onset of treatment showed on the whole a similar picture, but all had hydrocephalus; and in case 26 (death on the 12th day), though sections showed a caseating proliferative tuberculous cellular reaction in the meninges, the acute exudative lesion of the classical cases was absent, and there was no arteritis.

A feature of the 14 cases dying between the 28th and 56th days was the degree of hydrocephalus, all but 2 showing considerable dilatation of the ventricles. All had evidence of active tuberculous meningitis, and only in case 65, where the patient died in the 8th week, was there any histological evidence of healing in the central nervous system. This case had "firm white granulations in the interpeduncular fossa," and sections showed "ischæmic softening in the brain, active tuberculous ependymitis, healed and active tuberculous arteritis throughout the subarachnoid space, and a slight and patchy but definite tuberculous leptomeningitis of the base of brain and spinal cord." In case 79, where the patient also died in the 8th week, granulation tissue reaching a thickness of 5 mm. or more was present over the lower part of the spinal cord.

All 11 cases in which death occurred during the third and fourth months of treatment had hydrocephalus, and in many it was exceedingly severe. The degree of active infection present and the number of acid-fast bacilli seen in the lesions varied very much. Case 4, dying after thirteen weeks' treatment, showed granulations localised to the interpeduncular fossa, and caseous necrosis in the region of the tuber cinereum, teeming with acid-fast bacilli; the basilar arteries showed a striking occlusive fibroblastic intimal proliferation. In

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case 67 there was little evidence of active tuberculosis in the central nervous system, but there were perivascular fibrosis and endarteritis.

Of the 8 cases dying after more than four months, 7 had a considerable degree of hydrocephalus, and in 3 cases it was extreme.

Case 15 showed no hydrocephalus. This was a girl of 4 years who made a clinical recovery during the first four months of treatment and had only one positive tubercle-bacillus culture from the C.S.F. in this period; she later relapsed, and died seven months after starting treatment. At necropsy the cerebral lesions were all of an acute type; numerous small tuberculomata were present in the brain, and many were very active in appearance and communicated with the meninges; there was also an active primary complex in the lungs, caseous glands in the abdomen, and miliary tubercles throughout both lungs and in the liver, spleen, and kidneys.

Case 27.—In contrast to case 15, this child, aged 2½ years, who died after 120 days' treatment, showed only slight evidence of any active infection in the C.N.S.; there was gross distension of all ventricles, and the interpeduncular fossa contained scar tissue 0·25 cm. thick; the arachnoid over the rest of the brain was slightly opaque, and the dorsal surface of the spinal cord was covered with a gelatinous exudate. Histological sections showed persistent tuberculous meningitis at the base of the brain and of the spinal cord. During treatment in this child the C.S.F. elements, except for protein level which remained high, returned to normal, and on no occasion after starting treatment were tubercle bacilli isolated.

The other cases in this group all showed active tuberculous meningitis, but there was evidence in several cases of this becoming chronic. Case 82 showed an extreme degree of hydrocephalus and only a small amount of caseating exudate in the basal cistern; yet this exudate contained vast numbers of acid-fast bacilli, and histological sections showed extensive tuberculous meningitis.

OTHER ORGANS

A description of the other lesions found at necropsy must be left for report elsewhere, as must also the more detailed analysis of lesions in the central nervous system. A few outstanding features may, however, be given here.

The state of the lesions in the central nervous system, showing only in rare cases any evidence of healing, must be contrasted with the state of miliary lesions found in other parts of the body. Miliary lesions in the lungs were present in 18 of the 51 cases on which a full examination was made; many showed definite evidence of healing, and this is in concordance with the radiological clearing of pulmonary miliary lesions observed in these cases during life. Similar fibrosing tubercles were found in other organs, particularly in cases which had been treated for several months. The healed lesions were similar to those found in chronic miliary tuberculosis and showed all stages of healing. They were all non-caseous and contained few or no tubercle bacilli. Some consisted of masses of epithelioid cells separated by reticulin. In others, presumably older, the reticulin was giving way to collagen fibres and the epithelioid cells were disappearing. Finally there were foci of hyalinised fibrosis recognisable as tubercles only because of their shape and because transitional forms were present.

It is interesting to note, however, that alongside these fibrosing lesions were found in some cases also active tubercles of obviously recent formation. In addition—and this is perhaps one of the most important findings—an active primary complex, with caseous pulmonary and glandular lesions, was found in 38 of the 51 cases; 2 more had caseous bronchopulmonary glands without a visible lung focus; and 2 had a mass of caseous glands in the abdomen. These lesions had apparently been unaffected by streptomycin treatment even over long periods.

Discussion

The streptomycin treatment of tuberculous meningitis, prolonging the course of the disease in most cases, producing considerable improvement in many and possibly clinical cure in a few, represents an outstanding advance. The problem of improving the results so far achieved raises numerous questions, many of which still remain unanswered.

DIAGNOSIS

An important finding is that the prospects of a favourable response are greatest in early cases and very poor in patients admitted comatose or with established gross pareses.

The findings render imperative a close observation of tuberculous patients, particularly of children with diagnosed miliary or primary tuberculosis, for signs of incipient meningitis. In these circumstances, where a very early diagnosis may be made, what abnormal C.S.F. findings may be considered diagnostic? Doubts have been raised about the validity of the diagnosis in certain cases with minimal findings which Lincoln (1947) terms "tuberculous serous meningitis." The condition she describes is probably exceptional (one such case was seen in a M.R.C. centre), and for the present it is justifiable to suggest that any patient with diagnosed tuberculosis and a lymphocytic reaction in the C.S.F. should be treated as a case of tuberculous meningitis unless an alternative diagnosis is clearly demonstrated. A reduced C.S.F.-chloride level should not be considered indispensable for the diagnosis.

The main problem is that of securing earlier diagnosis in patients not previously known to be tuberculous. Both before and after the admission to hospital of a patient with suspected meningitis much can be achieved by a systematic search for collateral evidence of tuberculosis; such evidence was elicited in the great majority of cases reported here. The importance of a history of contact, and of the Mantoux test, particularly in children, is worth emphasis: 72 of 73 patients in whom the test was completed were positive. The urgency of establishing the diagnosis justifies the use of O.T. 1/1000 as first test instead of a weaker dilution; if the child is not tuberculous, no harm can result; if tuberculous, the questionable risk of a focal reaction is amply offset by the advantage of early diagnosis.

TREATMENT

Analysis of cases which responded well to streptomycin has shown that modes of treatment differing considerably in rhythm and duration were apparently equally successful; it is therefore impossible at present to draw hard and fast conclusions about optimal methods.

That intrathecal treatment is practically indispensable is one of the few definite findings. Why this should be so is still conjectural. In many cases intramuscular therapy controlled the general infection for several weeks; this would account for the initial good general response. But apparently the meningeal infection was controlled only at borderline level, with the patient in a precarious state sometimes for months before finally succumbing. The streptomycin concentration in the C.S.F. reached by intramuscular injection alone was one which might be considered a satisfactory bacteriostatic level. Were the levels reached by intrathecal injection bactericidal? The bactericidal action of streptomycin has been emphasised by Garrod (1948). Is there in some cases a frequent discharge of tubercle bacilli into the C.S.F. from cerebral lesions which, as pathological findings suggest (Baggenstoss et al. 1947), are untouched by streptomycin?

Until it is understood why intrathecal treatment is necessary, it is obviously impossible to say at what intervals and for how long the dosage should be continued. Continental workers, such as Debré et al. (1947), favour a short intensive intrathecal course not repeated later except in the event of relapse; in this country and in the U.S.A. longer courses are favoured, though it is acknowledged that protracted courses may be harmful.

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It is too early to compare results on this basis. The high C.S.F.-streptomycin level should perhaps be maintained for longer than is possible with intrathecal injections only once a day. Possibly the surgical procedures suggested in the Oxford report should be adopted more often. Probably patients diagnosed only at a late stage require highly intensive treatment if they are to respond at all; probably where tubercle bacilli are found repeatedly in the C.S.F. during the first three weeks more prolonged and intensive intrathecal treatment is called for; it is likely that intrathecal treatment should be resumed at the first sign of relapse. An interesting feature in patients on intramuscular therapy only has been a rising C.S.F.-streptomycin level before clinical signs of deterioration appear; possibly a rising level, even in the absence of known signs of relapse, should be an indication for the resumption of intrathecal treatment.

Intramuscular therapy is indispensable, and should probably be given continuously for three months at least; but whether it should be continued much longer without interruption, or whether periods of total rest from treatment are desirable, followed by repeated courses, it is impossible to say. No relapse that occurred in this series could be clearly attributed to premature suspension of treatment; indeed, some patients improved remarkably during periods when all treatment was suspended.

The evidence suggests that patients with miliary tuberculosis detected in the lungs, or with active primary tuberculosis, should have long courses of intramuscular treatment; the large caseous glands found in some patients treated for many weeks are evidence that, though the general infection may be controlled with streptomycin, in some patients the primary source of tubercle bacilli remains a danger. Possibly, however, this danger is no greater than in the average primary infection, and streptomycin is effective in controlling degrees of infection that are uncontrollable by natural defence mechanisms.

Should treatment be undertaken in patients diagnosed at an advanced stage? At present, when limitations in both streptomycin supplies and beds in treatment centres necessitate the selection of cases most likely to respond, the answer can only be that such patients should not be accepted for treatment. Later, if supplies and beds are available, but if the prognosis for advanced cases remains as severe as before, the problem will be a moral one very difficult to resolve. When, if at all, should treatment be stopped in patients deteriorating? Judging from the course of the illness in this series, it seems that where there is progressive severe deterioration throughout two months of treatment it is justifiable to cease treatment at the end of that period to avoid the miserable deferment of an inevitably fatal outcome.

Can the prognosis be improved by association of streptomycin with another chemotherapeutic agent? Experimental work by Smith et al. (1946) and clinical results reported by Cocchi and Pasquinucci (1947) and Lincoln et al. (1948) indicate that streptomycin associated with a sulphone may give better results than streptomycin alone; possibly much further progress will be made along these lines.

RELAPSES

Prognosis in patients responding well to streptomycin treatment is clouded by the possibility of late relapses, the causes of which are still obscure. Late thrombosis of cerebral vessels may have been the dominant feature in one or two cases but was certainly not the major cause of most relapses. Were they caused by the multiplication of tubercle bacilli resistant to streptomycin? The evidence is against such an explanation. Strains isolated from 19 of 22 patients after several weeks or months of treatment were as sensitive to streptomycin as strains isolated before treatment was started. As was suggested above, these sensitive bacilli may have come from foci in the brain not reached by streptomycin given systemically.

The persistence and breakdown of foci of infection inaccessible to circulating streptomycin may well be an important factor in the relapses observed. In some, however, the impression was that renewed spread of tuberculous infection was not alone responsible. This applies to patients in whom the clinical character of the relapse pointed rather to progressive or acute hydrocephalus as the dominant feature; it also applies to some patients who continued to deteriorate from the date of admission to death many months later, though the clinical picture indicated that the infection was under control. Coupled with these observations, the frequent post-mortem finding of obstruction at the base of the brain, particularly in the interpeduncular fossa, and the gross internal hydrocephalus present in so many cases, indicate that mechanical factors of obstruction due to organisation of tuberculous exudate were at least partly responsible for the clinical deterioration.

Was this to be expected as a feature of the normal healing process in an intracranial tuberculous infection that had been arrested? Or was continued production of exudate from a persistent infection responsible? Or were infection and obstructive organisation of exudate mutually reinforced, in that colonies of tubercle bacilli flourished in fibrin-walled pockets inaccessible to streptomycin from the thecal space or from the systemic circulation? The pathological features of cases in which death took place after many months indicate that both factors are responsible for many of the relapses seen, though their relative places in the sequence of pathological events remain obscure.

It is now a commonly expressed view that the prevention of fibrinous organisation of exudate at the base of the brain would considerably reduce the number of late relapses. Possibilities of such prevention are being investigated,§ in particular by the prophylactic use of heparin, but the work is still at an experimental stage.

Recommended Procedures

DIAGNOSIS

Early diagnosis has become of prime importance. In the great majority of cases the diagnostic problem presents in one of two ways:

(1) A patient has a history and clinical signs suggesting meningitis. Confirmation of meningitis and evidence of its tuberculous nature are required. Apart from full clinical examination, the following are indispensable procedures, to be carried out within 24 hours of admission to hospital:

(*a*) Full inquiry about tuberculosis contact.

(*b*) Mantoux test, with 0·1 ml. of old tuberculin 1/1000. If negative after 48 hours, repeat with O.T. 1/100.

(*c*) Chest radiogram.

(*d*) Examination of fundi for choroidal tubercles.

(*e*) Lumbar puncture. Examination of C.S.F. for levels of protein, sugar, and chlorides; cell-count (with differential); and isolation of tubercle bacillus. At least two adequate samples of C.S.F. should be examined before starting treatment. Both should be centrifuged; from part of the deposit a thick film should be made, and the rest should be cultured and injected into guineapigs. For the latter it is best to emulsify the deposit in 1–2 ml. of the supernatant fluid. Strains isolated should be tested for sensitivity.

(2) In a patient with diagnosed tuberculosis slight character changes (irritability, drowsiness), vomiting, and a rise in temperature should arouse suspicion of meningitis. Lumbar puncture is imperative for confirmation.

TREATMENT

Treatment must be started without delay when there is definite or strong presumptive evidence of tuberculous

§ In centres under the Ministry of Health scheme.

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meningitis. Bacteriological confirmation must not be considered a prerequisite to starting treatment.

(1) *Intramuscular therapy:* the daily dose should be not more than 0·02 g. per lb. of body-weight; it may be given in divided doses—four 6-hourly, or two 12-hourly, doses. It should be continued uninterruptedly for three months at least. Further treatment beyond that period is probably necessary, even in cases responding very well. Long treatment is recommended particularly for patients with miliary or recent primary tuberculosis.

(2) *Intrathecal therapy* must be considered indispensable pending further information about the occasional type of case that may not require it. The dose now recommended is 0·05–0·1 g. per day in one dose. The optimal intrathecal treatment for the first three months will probably be found to be either a short intensive course (with possibly injections twice a day) or two courses interrupted by a rest period, or treatment only every two or every three days for two to three months. When intramuscular treatment is given 12-hourly, the intrathecal injection should be given six hours after the last intramuscular injection.

(3) *Relapse and spinal block:* a patient who, after responding well to treatment for some weeks, begins to vomit and becomes slightly irritable and drowsy must be considered as in danger of relapse. Important clinical features which may precede or follow the first appearance of these symptoms are an increasing lymphocyte-count in the C.S.F., a falling C.S.F.-sugar level, and a rising C.S.F.-streptomycin level (when the patient is off intrathecal treatment). Diagnosis of impending relapse makes imperative immediate resumption of combined therapy.

When complete spinal block develops at an early stage of treatment, streptomycin should be administered by the cisternal or ventricular route instead of by the lumbar route. At a late stage of treatment, particularly if the intrathecal course has been completed, in the absence of clinical evidence of increasing infection it is probably unnecessary to attempt to administer streptomycin by other than the intramuscular route. Evidence of increasing intracranial pressure, with probable progressive hydrocephalus, calls for relief of the pressure by ventricular tap or repeated lumbar puncture.

Work on the prevention of organisation of exudate is still at an experimental stage. Present lines of investigation include the use of heparin to prevent fibrin formation, and routine surgical drainage to the base of the brain (see Oxford report).

(4) *Convalescence:* the time of discharge will depend on local hospital facilities, and in most cases it will be impracticable to retain the patient in the original streptomycin centre until the C.S.F. is normal. In all cases, the patient should go from hospital to a convalescent institution or a sanatorium where general care is particularly good and expert medical supervision is possible. He should be re-examined at, say, three-monthly intervals for two years by the doctor originally in charge of him. The convalescent patient should be considered primarily as a tuberculous patient recovering from a severe form of the disease, and cared for as such for at least two years after leaving hospital. Psychometric examination should be made at the earliest opportunity.

ROUTINE RE-EXAMINATIONS OF C.S.F.

Levels of protein, sugar, and chlorides, and cell-counts with differential counts should be estimated once weekly during treatment, and after treatment has stopped fortnightly for three months. If at the end of three months the C.S.F. elements have not returned to normal, lumbar puncture should be repeated at monthly intervals until normal. If there is a rising lymphocyte-count, or a falling sugar level, the need for further intrathecal treatment should promptly be considered.

Isolation of tubercle bacillus: frequent examinations by film and culture are recommended during the first few weeks of treatment, since they may be a valuable guide to prognosis. Thereafter culture (and film examination if time allows) of the C.S.F. once a week is probably adequate. Any specimens of C.S.F. taken after treatment ceases should be cultured, and a film should be examined if the cell-count has increased.

Sensitivity tests: all positive cultures isolated after a month or more of treatment should be tested for their sensitivity to streptomycin.

Streptomycin assays: in a case of spinal block, if cisternal or ventricular specimens are taken, they should be tested for streptomycin level. When the patient is on intramuscular treatment only, assays should be done once a week; a rising C.S.F.-streptomycin concentration may be the first indication of increasing infection, and resumption of intrathecal treatment should then be considered.

Specimens for assay must not be passed through a Seitz filter, since this removes much of the streptomycin.

Addendum

On March 15, 1948—i.e., after a minimal period of seven months' observation of all survivors—amended figures for tables I and VI are as follows:

—	No. of cases admitted before Aug. 18, 1947	Condition on March 15, 1948			
		Good	Stationary or relapsed	Deteriorating	Dead
Table I	105 (*100*%)	27 (*26*%)	6 (*6*%)	1 (*1*%)	71 (*67*%)
Table VI	48 (*100*%)	19 (*40*%)	3 (*6*%)	0	26 (*54*%)

Three patients who were making good progress in December relapsed and died in the subsequent three months: (1) case 81, a child who responded well to intrathecal streptomycin after being on intramuscular therapy alone; (2) case 37, an advanced case on admission; (3) a patient at Oxford, not reported in detail in this paper. The 27 other patients doing well in December have continued to improve; in several cases the C.S.F. has become normal.

Summary

This report analyses the results on Dec. 15, 1947—i.e., after a minimum of 120 days' observation of survivors—in 105 cases of tuberculous meningitis admitted to M.R.C. centres before Aug. 18, 1947, and treated with streptomycin.

All the cases were proved by culture, by guineapig inoculation, or by post-mortem histology. Collateral evidence of tuberculosis was found in a high proportion of cases.

Of the 33 children under 3 years, 27 (82%) had died and 4 (12%) were making good progress in December. Of the 72 older children and adults, 40 (56%) had died and 26 (36%) were making good progress.

Of the patients admitted at an early stage of the disease, 42% were making good progress in December, compared with 26% of those at a medium stage, and 7% of those at an advanced stage on admission.

Of the patients who received only intramuscular streptomycin, 11% made good progress, compared with 35% of those receiving streptomycin by both intramuscular and intrathecal routes. 50% of cases, age 3 years and over, admitted at early or medium stages, and receiving combined therapy, made good progress.

The streptomycin levels in the cerebrospinal fluid during intramuscular treatment alone ranged usually between 3 and 16 μg. per ml. In patients recovering, the range was lower; in some patients deteriorating the level rose as the meningitis progressed.

Case-records representative of the various types of clinical response to streptomycin treatment are given. The condition of 23 patients making good progress in December, 1947, is described. The main features of the 17 cases of clinical relapse are given.

In patients who ultimately fared badly tubercle bacilli were isolated from the cerebrospinal fluid much more frequently during the first three weeks than in patients who made good progress.

Strains isolated from 22 patients between the 29th and 136th days of treatment were tested for sensitivity; only 3 of these were resistant to streptomycin.

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Necropsy findings are discussed. Communicating hydrocephalus was found in most cases.

An addendum brings the main results up to March 15, 1948, when 27 cases were still doing well.

The clinical work in these trials was coördinated by Dr. Marc Daniels (scientific staff, M.R.C.), who also prepared this report for the committee, with assistance from Dr. Mary Barber (Hammersmith Hospital) in the analysis of the pathological data.

The opinions expressed in the report represent a consensus of the opinions of the majority of clinicians and pathologists concerned in the trials, of whom those principally involved are named below. The committee is indebted to them for their constant coöperation and for the detailed investigations undertaken.

Centre	*Clinicians*	*Pathologists*
Hammersmith Hospital (L.C.C.)	Dr. D. MacCarthy Dr. T. P. Mann	Dr. Mary Barber Dr. I. Doniach
Royal Hospital for Sick Children, Glasgow	Prof. G. B. Fleming Prof. Stanley Graham Dr. P. McArthur	Dr. G. L. Montgomery
Alder Hey Children's Hospital, Liverpool	Prof. N. B. Capon Dr. R. M. Todd	Prof. A. W. Downie Dr. H. Lederer
The Hospital for Sick Children	Dr. P. M. Ransford Dr. B. J. Hussey	Dr. I. A. B. Cathie Dr. J. C. W. MacFarlane
The National Hospital for Nervous Diseases	Dr. E. A. Carmichael Dr. A. P. Morley	Dr. J. N. Cumings Dr. R. E. Kelly
Guy's Hospital	Dr. P. R. Evans Dr. C. W. Kesson	Dr. F. L. Jackson Prof. G. Payling Wright
Highgate Hospital (L.C.C.)	Dr. A. L. Jacobs Dr. J. Rubie	Dr. J. M. Alston Dr. A. Mohun
Radcliffe Infirmary, Oxford	Sir Hugh Cairns Dr. Honor Smith	Dr. R. L. Vollum Dr. P. D. Daniel

The clinical pathologists met on several occasions, under the chairmanship of Dr. Robert Cruickshank, to discuss technique and the many other problems arising. A group of morbid anatomists were responsible for a memorandum on necropsy procedure.

REFERENCES

Baggenstoss, A. H., Feldman, W. H., Hinshaw, H. C. (1947) *Amer. Rev. Tuberc.* **55**, 54.
Cocchi, C., Pasquinucci, G. (1947) *Riv. clin. pediat.* **45**, 193.
Council on Pharmacy and Chemistry (1947) *J. Amer. med. Ass.* **135**, 634.
Debré, R., Thieffry, S., Brissaud, E., Noufflard, H. (1947) *Brit. med. J.* ii, 897.
Dubois, R., Linz, R. (1947) *Bull. Acad. Méd. Belgique*, **12**, 13.
Dubos, R. J., Davis, B. D. (1946) *J. exp. Med.* **83**, 409.
Garrod, L. P. (1948) *Brit. med. J.* i, 386.
Hinshaw, H. C., Feldman, W. H., Pfuetze, K. H. (1946) *J. Amer. med. Ass.* **132**, 778.
Lancet (1947) ii, 360.
Lincoln, E. M. (1947) *Amer. Rev. Tuberc.* **56**, 95.
— Kirmse, T. W., De Vito, E. (1948) *J. Amer. med. Ass.* **136**, 593.
Mollaret, P. (1948) *Pr. méd.* **56**, 124.
Smith, H. V., Vollum, R. L., Cairns, H. (1948) *Lancet* (in the press).
Smith, M. I., McClosky, W. T., Emmart, E. W. (1946) *Proc. Soc. exp. Biol., N.Y.* **62**, 157.

BLOOD-SUGAR LEVELS IN SLOW STARVATION

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SUGAR is so stable a constituent of the blood that if the level falls from 80 to 75 mg. per 100 ml. symptoms of hypoglycæmia may develop. Nevertheless in some cases the level has fallen to 30 mg. per 100 ml. or less before any symptom could be detected (Wright 1942). Conn (1940) reported cases in which symptoms did not appear until the level reached 21–37 mg. per 100 ml. These were cases in which the usual level was normal. But where the usual level is below normal, symptoms develop only when the level is further reduced. The reason for this is not known. Harris (1924) suggested hyperinsulinism. Wilder and his associates (1927) corroborated him. Conn (1940) classified the cases into two broad groups, functional and organic. He reported cases in which symptoms of hypoglycæmia appeared when the blood-sugar level fell to 14–18 mg. per 100 ml.

Harris also studied blood-sugar levels in starvation and found that in rabbits the lethal level was 40 mg. per 100 ml. In three patients who could not eat anything owing to obstruction of the œsophagus by malignant growth he obtained blood-sugar levels of 90, 84, and 90 mg. per 100 ml.

I have studied blood-sugar levels in 407 cases of pure malnutrition due not to disease but to the Bengal famine of 1943–45. These patients were not usually hypoglycæmic, because when they recovered their blood-sugar levels were normal. They were all free from any disease as determined clinically or by laboratory examination.

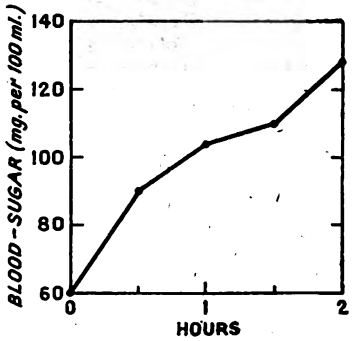

Fig. 1—Glucose-tolerance test in fairly advanced stage of starvation (50 g. of glucose given by mouth).

METHODS

Blood was drawn with a hypodermic syringe from the antecubital vein in the morning before the patient had any food or intravenous medication. Neutral potassium oxalate 2 mg. per ml. of blood was added as anticoagulant. Folin and Wu's method was used in the estimation and a Klett colorimeter in the colour comparisons. All estimations were done in natural light in the hospital laboratory. In no case did more than 15 min. elapse between collection and examination of the sample.

RESULTS

About 60% of cases showed a blood-sugar level below 80 mg. per 100 ml., but no symptoms of hypoglycæmia were present. The distribution of different blood-sugar levels was as follows:

Blood-sugar (mg. per 100 ml.)		
Below 80	*80–120*	*Above 120*
59·1%	34·7%	6·2%

Below 40	*40*	*Above 40*
5·6%	3·9%	90·5%

It will be seen that, though most cases showed a low blood-sugar level, a few gave figures above normal. However, when cases with a low blood-sugar level were further scrutinised, 5·6% showed a blood-sugar level below 40 mg. per 100 ml.

The average and the range of the blood-sugar values were as follows:

Blood-sugar (mg. 100 per ml.)		
No. of cases	*Average*	*Range*
407	76·7	19·2–307·6

The lowest value for blood-sugar was 19·2 mg. per 100 ml. This was found in only one case, which proved fatal, but another patient with a level of 20 mg. per 100 ml. survived. As already stated these patients did not show hypoglycæmic symptoms, but their general condition was low, with extreme emaciation and prostration. They could hardly speak distinctly. They were fully conscious and eager to live. One patient had a blood-sugar level of 17·6 mg. per 100 ml., but he also had cancrum oris and died; this case is not included in this review but was published elsewhere (Chakrabarty 1944).

A sugar-tolerance test was done on many of them by giving 50 g. of glucose by mouth. A representative

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curve (fig. 1) shows that the blood-sugar level rose slowly, and showed no sign of falling within the next two hours; this shows that both absorption and disposal of sugar were slow. In case two hours might be insufficient time for such processes in starvation, blood-sugar levels were measured for four hours (curve for Dec. 18, 1943, in fig. 2). The blood-sugar level rose slowly for three hours, and then began to fall very slowly.

Glucose-tolerance tests during convalescence (fig. 2) show that, as the patient slowly improved, the blood-sugar curve gradually approached the normal, a faster rise being followed at the end of an hour by a fall. It also shows that, as convalescence proceeded, the initial blood-level became higher.

The same was found of the other constituents of the blood. Thus the plasma-protein, which showed enormous depletion during starvation and almost reversal of the normal ratio (albumin 1·33 g. per 100 ml. and globulin, including fibrinogen, 4·54 g. per 100 ml.), returned almost to normal. Lehman (1947) reported 0·75 g. per 100 ml. to be the lowest albumin content in his investigation of starvation.

Necropsy in fatal cases showed (1) pale and thinned-out small intestine with patchy denudation of mucosal epithelium and submucous hæmorrhages; (2) shrinking of the liver cells with wide intercellular spaces and interference with the staining reactions of the liver tissue (hæmatoxylin and eosin); and (3) fewer cells in the islands of Langerhans and a few foamy cells. Campbell

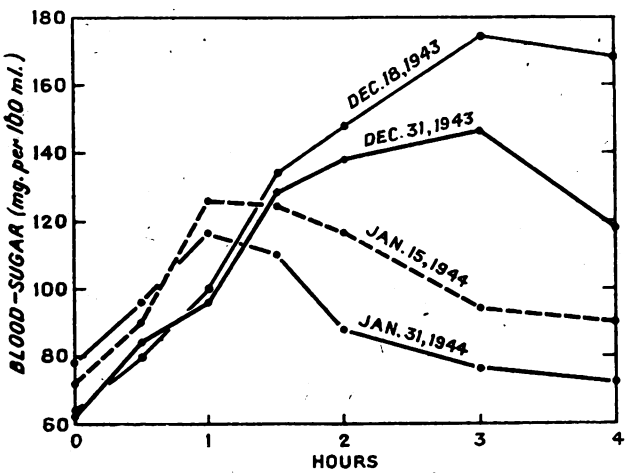

Fig. 2—Glucose-tolerance tests done on Dec. 18, 1943, in advanced stage of starvation, and at different dates during convalescence (50 g. of glucose given by mouth).

and Kosterlitz (1947) obtained similar findings in the liver of experimentally protein-starved rats.

SUMMARY

In an investigation of 407 cases of slow starvation in the Bengal famine of 1943–45 not complicated by any disease, blood-sugar levels were found to be very low, but there was no symptom of hypoglycæmia.

In advanced starvation sugar-tolerance curves showed a slow absorption and excretion.

As convalescence proceeded, the curve returned towards normal, and the initial blood-level became higher. Necropsy showed considerable changes in the liver, intestines, and pancreas.

REFERENCES

Campbell, R. M., Kosterlitz, H. W. (1947) *J. Physiol.* **106**, Proc. 12.
Chakrabarty, M. L. (1944) *Indian med. J.* **38**, 145.
Conn, J. W. (1940) *J. Amer. med. Ass.* **115**, 1669.
Harris, S. (1924) *Ibid*, **83**, 729.
Lehman, H. (1947) verbal communication at the meeting of the Physiological Society of Great Britain on April 18, 1947.
Wilder, R. M., et al. (1927) *J. Amer. med. Ass.* **89**, 348.
Wright, S. (1942) Applied Physiology. 7th ed., London; p. 660.

INTENSIFIED ELECTRICAL CONVULSION THERAPY

IN THE TREATMENT OF MENTAL DISORDERS

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IN an attempt to improve on the results of previous recognised methods of administering electrical convulsion therapy (E.C.T.) the effect of increased voltage and duration has been investigated.

In the developmental stages of the new technique the voltage was gradually increased from the minimum necessary to produce a major convulsion—i.e., about 100 volts—to a fixed standard of 150 volts. The duration was similarly increased from 0·3 sec. to a standard of 1 sec. Later the effect of repeated electrical shocks administered during the convulsive phase was investigated. Ultimately a standard of 150 volts for 1 sec. followed by five shocks during the primary convulsion was reached, since it was noted that, once a major convulsion had been induced, no increase in intensity of the convulsion resulted from the extra shocks.

TECHNIQUE

Treatment is given daily and never less than two hours after an ordinary meal. The few patients who show apprehension, or are known to be restless after treatment, are given sedation with 'Sodium amytal' gr. 6 an hour before the treatment begins. Immediately before treatment the patient is encouraged to micturate and to blow the nose, and artificial dentures are removed.

Treatment is given on a bed with an ordinary mattress from which the pillows have been removed. Tight clothing is loosened. The only restraint necessary is a nurse on each side of the patient holding the wrist to the side and the shoulder down on the bed. Excessive abduction of the lower limbs is prevented, but flexion and extension are permitted. A gag consisting of two wooden spatulæ covered with lint is placed between the teeth and kept in contact with the lower teeth to prevent the tongue from protruding. Excessive opening of the jaw is prevented by manual restraint. No preparation of the temporal skin is necessary, nor is the hair shaved.

The electrodes soaked with saturated saline are placed on the temples and a 50-cycle alternating current at 150 volts for 1 sec. duration is administered. About 4 sec. later five further shocks at 150 volts, each for 1 sec., are given in rapid succession, by the timing switch. By this procedure the patient receives 1+5 shocks—i.e., one convulsion and five additional stimuli. Since salivation is increased immediately after a convulsion, a linen square is placed over the patient's lips.

Treatment is repeated daily until symptoms have evidently been relieved. If there is no pronounced improvement after three successive treatments of 1+5 electrical stimuli, the number of shocks is increased to 1+7, and further increased to 1+9 if there has been no response after five daily treatments at this time and voltage. Treatment is continued at the maximal level of intensity. To enable this large number of extra shocks to be given before the end of the clonic phase the time switch must be operated as rapidly as possible.

Daily treatment in every case is stopped as soon as there is a remission of symptoms or pronounced confusion is evident—i.e., the patient becomes faulty in habits. It is seldom necessary for the patient to reach this stage of confusion, because a remission usually takes place after the first few treatments. Amnesia resulting from the treatment can be ignored, and the course continued if a remission of symptoms has not already taken place. Memory always returns within a few days, and any distress caused by the amnesia responds to reassurance and explanation after each treatment.

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INTENSIFIED E.C.T. RESULTS

Type of case	Technique	No. of cases	Average no. of treatments	Average no. of treatment days	Average no. of days in hospital
Women					
Melancholia	Old	58	6·9	26·5	63·0
	New	52	3·8	13·3	55·0
Schizophrenia	Old	12	10·5	52·5	146·0
	New	7	5·3	14·1	79·5
Mania ..	New	9	4·35	21·0	60·0
Puerperal ..	New	6	6·35	43·5	92·5
Men					
Melancholia	Old	22	7·3	25·6	63·5
	New	6	2·66	12·8	62·5
Schizophrenia	Old	4	9·25	35·8	108·0
	New	6	5·85	24·6	73·0
Mania ..	New	6	3·17	14·2	59·0
Hysteria ..	New	6	3·84	4·8	31·0

Patients remain recumbent for at least an hour after each session, or until they awake.

TYPES OF CASES TREATED

All the patients treated were either voluntary or certified inmates of a county mental hospital. Numerous outpatients have also been treated but are not included in the results, since they do not give comparative figures of treatment days. Similarly, patients who have received treatment by both methods have been excluded.

The patients treated were aged 16–74, and no additional risks appear to be run in the elderly. Thirty patients over the age of 60 have been successfully treated by the new technique; the convulsion produced in older persons appears much less severe, probably because the muscles are weaker. Hyperpiesis has not been found to be a contra-indication to treatment, and patients with a systolic pressure of 220 mm. Hg have been treated without complications.

The treatment was used to relieve acute symptoms in schizophrenia, facilitating later treatment with insulin.

INTERPRETATION OF RESULTS

The group schizophrenia includes all schizophrenic types. Cases of manic depressive psychosis are classified under the headings "melancholia" or "mania" according to the phase they presented at the time of treatment. Melancholia includes all cases presenting depression as a symptom, and no distinction between exogenous and endogenous depression has been made, since it was found that both types responded equally well to the new treatment. Puerperal includes all those with acute mental symptoms between two days and eight weeks after childbirth.

The figures for the number of days under treatment and the number of days in hospital (see table) have been calculated from the first day of treatment. This was done to make the results of the old technique comparable with the new, since previously some patients had been in hospital for various periods before treatment began, whereas treatment by the new method usually began a few days after admission to hospital.

The table shows that the average number of treatments received per patient in each group of cases has been about halved by the new technique. Similarly the average number of days under treatment by each patient is also halved. No figures are available for the groups mania, puerperal, and hysteria by the old technique. There is little difference in the number of days patients remained in hospital. This is because patients have been encouraged to remain in hospital for at least four weeks after their last treatment, since it was believed in the past that relapses were likely during this period.

With the old technique, in the group of female melancholics 45 (77·6%) relapses occurred in 58 cases. With the new technique 20 (40·8%) relapses occurred in 49 cases. These relapses occurred on the average four weeks and two weeks after a remission of symptoms by the old and new methods respectively. The relapse-rate has therefore been reduced by about half, and since they take place on the average two weeks after a remission, patients could undoubtedly be discharged from hospital earlier.

Of cases of melancholia about 23·4% did not respond to the old technique, whereas only 11·9% did not respond to the new. There were 8 patients with melancholia who had received E.C.T. at other hospitals without apparent improvement and subsequently responded to the new technique.

Patients with acute mania improved rapidly, and none required longer than forty-eight hours in a protected room.

Patients still exhibiting acute symptoms immediately after treatment were treated again within an hour, and this usually produced a satisfactory response, but occasionally a third treatment on the same day was required. These treatments have conformed to the technique of 1+5 or more.

The risk of fracture seems to be less with the new technique than with the old. More than 300 patients have received treatment by the new technique, and more than 1500 individual treatments have been given, without fracture or dislocation.

As a development of this intensive E.C.T. technique, we have begun to investigate the effect of lengthening the initial shock beyond 1 sec. to reduce the number of repeated shocks, but sufficient cases have not yet been completed to give comparable results.

Our thanks are due to Dr. Neil McDiarmid, the medical superintendent, for permission to publish these results, and to the nursing staff for their coöperation and assistance.

LOCAL FASCIAL REPAIR OF FEMORAL HERNIA

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MUCH has been said by many about preventing recurrence of femoral hernia. Thread, catgut, silk, and wire, each material bringing in a wave of fashion, have all been described as ideal. The obliteration of the femoral ring with a strip of external oblique aponeurosis is a simple and reliable method and is a satisfying operation. It is not widely practised, and the importance of exact technique justifies attention being called to the procedure. It can be performed under local anæsthesia with ease.

The underlying principles of common methods have been either the approximation of the inguinal ligament to the pectineal fascia with staples or sutures, or the dragging down of conjoint tendon or rectus sheath flap towards the pectineal ligament (Astley Cooper's) as a shutter above the femoral ring. Both these methods depend on distortion, and the normal plane of the conjoint tendon is about 1 in. in front of the pectineal ligament. If it is sutured out of alignment there must be constant distortion in its pull, as part of the rectus and abdominal wall muscle mechanism.

The use of fascia strip facilitates repair by its breadth as a shutter in the femoral ring, as well as by partial approximation of the boundaries of the ring.

Technique.—The femoral sac is exposed and removed in the classical way by a combined approach through the

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inguinal canal and the femoral triangle. The transversalis fascia should in theory be sutured, but this is very often a technical uncertainty.

A wide strip (1/4 in.–3/8 in.) is then raised from the upper flap of the external oblique aponeurosis, as in the standard McArthur repair for inguinal hernia. It is left attached firmly to the pubic bone at its medial end and fixed to a small Gallie fascial needle by a single transfixion ligature of double 60 linen thread. The strip is then passed behind the medial end of the spermatic cord or round ligament, which is retracted upwards. This fascial suture is inserted into the pectineal ligament over the upper surface of the superior pubic ramus, thence through the recurved edge of the inguinal ligament and the pectineal ligament again; and the second insertion into the inguinal ligament should be up against the femoral vein. The vein is protected by a 2 in. Langenbeck retractor inserted through the ring upwards, held by the assistant with the front of the blade against the vein. The fascial strip is then passed through the conjoint tendon with one or two insertions, bringing it towards the inguinal ligament and not to the pectineal fascia, thus strengthening the posterior wall of the inguinal canal. The closure of the external oblique aponeurosis and the femoral dead space is straightforward.

It is not claimed that this is a guarantee of perfection and certain in cure; the absence of any substantiated claims to have found previous methods entirely satisfactory points to the difficulties both of cure and of proof of cure if such exists. Precision in technique is perhaps, in the cure of a lesion, more important than principles founded on different interpretations of the same problem of anatomy.

Medical Societies

ROYAL SOCIETY OF MEDICINE

Primary Treatment of Varicose Veins

A MEETING of the section of surgery was held on April 7, with Prof. ERNEST FINCH in the chair.

Mr. A. DICKSON WRIGHT said that the problem of recurrences after any form of treatment for varicose veins had led in the past to extensive and mutilating operations. Injection treatment had seemed full of promise when first introduced, but recanalisation was disappointingly common, particularly when there were a number of communications between deep and superficial channels. It was important to realise how high the venous pressure in the varices in the erect posture could rise, once the valves were incompetent; with a cannula in a vein at the ankle, the column of blood might reach the level of the right auricle. The essential step in treatment was, therefore, careful proximal ligature, and it was necessary to study the three venous systems—great saphenous, small saphenous, and gluteal—and to determine the sites where ligature was needed.

Mr. Wright illustrated with a film the technique of ligating the great saphenous vein at its junction with the femoral vein, followed by retrograde injection. Though this technique was simple, care was needed. A wild stab at a bleeding-point with a hæmostat might damage the femoral vessels. It was possible to tie the femoral vein in error, though this was not always as serious as feared, but tying the femoral artery was a major disaster, especially if retrograde injection had also been done, and usually cost the patient his leg; though he had known one such case where recognition of the injury and immediate end-to-end suture had been successful. Postoperative phlebothrombosis could be avoided by always operating under local anæsthesia and forbidding the patient to stay in bed afterwards. When it occurred it began in the lower calf, and should an actual pulmonary embolus take place it was best to tie off the femoral vein and administer anticoagulants. He had never known an embolus in patients operated on under local anæsthesia with immediate ambulation. There were a few patients whose vessels were hypersensitive to any form of injection, with widespread reflex vasospasm of arteries as well as veins, possibly leading to gangrene. The technique of small-saphenous ligature in the popliteal fossa was also illustrated with a film. After any ligating operation it was usually necessary to sclerose off residual varices with injections, either lithium salicylate or (in the unconscious patient) 30% saline.

Mr. J. B. KINMONTH discussed some results of venographic and histologic studies. Injection therapy might aim at an immediate clot in a stagnant pool below a tourniquet, or at a delayed clot resulting from intimal damage when the medium was allowed to enter the circulation; but, if the latter method failed from recanalisation, the varices would be worse than before owing to the injury produced in the valves. Radiographic studies of the fate of opaque media given as retrograde injections into the saphenous vein at the groin showed how inefficient this technique is. Much of the dye went straight into the deep veins and, partly because of this and partly owing to spasm of the saphenous, very little reached below the knee. A fluoroscopic study of injections into calf veins showed the dye to pass upwards in the erect position in normal veins and downwards in varices. In the horizontal position, with the limb at rest, a pool of medium remained at the site of injection for as long as a minute or two, and the obvious form of treatment was to use this method and so secure the maximum local effect; and then, by vigorous movements with the leg elevated, to sweep the irritant rapidly into the general circulation. Nevertheless, however carefully it was done, large amounts of medium collected rapidly in the deep veins. Veins removed for section after injection showed macroscopic œdema and inflammation of their walls. Microscopically, there was usually a surprisingly large amount of muscle to be seen, and this suggested that varicosity was a primary valvular failure with secondary venous hypertrophy. In treatment, Mr. Kinmonth's investigations indicated ligation at the groin for severe incompetence, but without retrograde injection, plus a ligature at knee level. Later, the calf veins could be injected if need be. For milder cases injection by the empty vein technique in the horizontal position should be used, employing no more than 1·5 ml. of solution, and with the limb kept quite still for five minutes.

Prof. A. M. BOYD regretted the paucity of end-result studies. The recurrence-rate was anything over 20% and increased year by year after the primary treatment. He thought that the essential cause of varicosity was a congenital deficiency of the valves in the communicating channels between superficial and deep veins, and that this was a progressive failure and not to be cured by any single operation. In the thigh the communications were short and direct, and pain was rare. In the calf the cross-channels traversed the muscles, and here muscle varicosities always preceded, and were more extensive than, the visible superficial dilatations; hence the frequency of quite severe pain and cramps below the knee. Experimental injections with mixtures of opaque media and sclerosing substances showed that the material introduced in the thigh rapidly enters, and stays in, the deep veins, and this was true only to a lesser extent in the calf where there is a larger superficial pool to take it up. Therefore proper ligature must be the keystone of treatment, and the greatest hazard here was to miss tying off an internal superficial femoral vein which had pierced the deep fascia at an abnormally distal level on its way to enter the termination of the great saphenous.

In the discussion, Mr. SOL COHEN questioned whether deep venous thrombosis was necessarily a contra-indication to any form of operation; he had done deliberate femoral ligatures on some of these cases with beneficial results. The rapidity with which injected matter entered the deep veins could be well shown by injecting 'Thiopentone' into a varicosity, when general anæsthesia was very little delayed. Because post-operative embolism arose from deep clot due to just such seepage, operation under local anæsthesia and immediate getting about were very important, and the use of general anæsthesia introduced a very real risk of thrombosis and embolism.

Mr. DICKSON WRIGHT, in his reply, said that any form of treatment during pregnancy, apart from bandaging, was inadvisable. It was true that hæmoglobinuria

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sometimes occurred after injections, but this was due to hæmolysis at the actual site of injection and did not indicate any renal damage. A varicose ulcer could always be made to heal by proper supportive bandaging, though recurrence was of course always likely unless ligation was performed later.

Reviews of Books

Psychotherapy: its Uses and Limitations

D. RHODES ALLISON, M.D., M.R.C.P.; R. G. GORDON, M.D., D.SC., F.R.C.P. London: Oxford University Press. 1948. Pp. 156. 8*s*. 6*d*.

THIS clear-headed little book does not take long to read. Neatly and precisely the authors strip away from psychotherapy the disguises in which credulity and detraction have combined to wrap it, and give a fair estimate of what may be done for patients by this method, and what kinds of patients can profit by it. They are aware that every good doctor practises psychotherapy whether he knows it or not, and are concerned only that he should give good, not harmful, treatment. The chapter on the patient's reaction to bodily disease, indeed, is one of the most interesting in the book; for though it contains little that the sound general practitioner does not know already, it sets out plainly the background of his knowledge, and suggests some guiding rules which will help the impulsive doctor to keep his sympathy in bounds, and encourage the cautious one to spread himself at times. Most of the book, however, is properly given to an account of the uses of psychotherapy in the treatment of the psychoneuroses, temperamental instability, psychosomatic conditions, visceral neuroses, mental deficiency, and psychopathy. A chapter on the relation of rheumatism to mental illness helps to sort out the components of this little-understood disorder, and another on the endocrine background reminds us how much man's nature depends on chemical tides within his body. The final chapters—on the organisation of psychotherapy and the combined approach to treatment by doctor, patient, relatives, and specialists—point the way to the better understanding of man as a whole which must be achieved by the instruction of medical students and public in our growing knowledge of the mind.

Recent Advances in Sex and Reproductive Physiology

(3rd ed.) J. M. ROBSON, M.D., D.SC., F.R.S.E., reader in pharmacology to Guy's Hospital medical school, London. London: J. & A. Churchill. 1947. Pp. 324. 21*s*.

THE general scope of this book remains the same, covering the nature of the sex cycle in certain lower animals and in man, and the changes that occur in the reproductive organs; the character, origin, and actions of the various hormones concerned; and the physiology of reproduction, pregnancy, parturition, and lactation. There are new and valuable chapters on the androgens, on the chemical composition and relationship of the various gonadal hormones, and on international standards and methods of assay. The sections dealing with ovulation, viability of ova and spermatozoa, and various other problems connected with fertility are disappointingly brief and sketchy, but there is a useful chapter at the end where pregnancy diagnosis tests are described (including the xenopus test) and the therapeutic uses of the sex hormones are discussed.

Surgical Disorders of the Chest

(2nd ed.) J. K. DONALDSON, M.D., F.A.C.S., associate professor of surgery and i/c of thoracic surgery, University of Arkansas. London: H. Kimpton. 1947. Pp. 485. 42*s*.

THIS is one of the few surgical works which manages to keep abreast of the rapid advance of chest surgery. The balance has been much improved in this new edition, though of course it has not been possible to cover the subject comprehensively in 500 pages. A section on the basic principles would introduce the subject more easily to the beginner. Lung abscess, œsophageal diseases, and subphrenic suppurations are clearly described, but the important chapter on empyema, though it gives a good classification, loses force in the treatment section. The need for dependent and adequate drainage might be more forcibly stressed, and so might the value of physiotherapy in obtaining lung re-expansion. The section on the anatomy of the bronchi would be improved by reference to Brock's work. War experiences have made the discussion on hæmothorax much more authoritative though decortication is perhaps over-valued. The book is a reasonable and welcome survey of a growing field.

Modern Plastic Surgical Prosthetics

A. M. BROWN, M.D., associate, Eye and Ear Infirmary, University of Illinois, Chicago. London: W. Heinemann. 1947. Pp. 289. 35*s*.

IN spite of the great improvement in modern plastic technique, there is still room for the use of prosthetic appliances in many situations where surgical treatment is either inadvisable or impossible. This book describes in detail the design and manufacture of artificial noses, eyes, ears, hands, fingers, and other structures in materials such as latex, acrylic resins, and vinylpolymers. In addition it covers the use of foreign-body implants in contour deformities, particularly of the chin, nose, and malar region. This section has less to recommend it in that there are few plastic surgeons today who do not use such methods with considerable reserve. A bad feature of the book is that the 180 illustrations are grouped at the end, so that reference to the text is difficult. On the whole, however, the book can be thoroughly recommended.

Differential Diagnose der Lungenröntgenbilder

(2nd ed.) R. ZEERLEDER, M.D. Berne: Huber. 1947. Pp. 296. Sw. fr. 28.

THE author has approached in a novel way the problem of differential diagnosis in chest radiography. He divides and subdivides pathological X-ray appearances into about sixty different types. Each type is introduced by a black-and-white drawing from a characteristic film. These pictures are then followed by a few typical case-histories and a résumé of every conceivable disease which could produce similar appearances. All this is coupled with brief details of the literature of each subject. The result is an enormous mass of valuable material so put together and abbreviated as to be almost unreadable. It is hard to find one's way, even when using it for reference. Dr. Zeerleder is to be congratulated on his industry and wide knowledge, but we wish he had not adopted this method of presenting it.

Principles and Practice of the Rorschach Personality Test

W. MONS, M.R.C.S. London: Faber and Faber. 1948. Pp. 164. 12*s*. 6*d*.

THE Rorschach test does not lack exponents. As Dr. Mons says, "by now, some three hundred books on the test have been published, apart from countless treatises in periodicals, and a paper of its own, *The Rorschach Exchange Research*. Already a host of conflicting theories have taken the battlefield . . .," and perhaps in such a private fight only those with extensive practical experience of the test should take part. The beginner may start to arm himself, however, with this book. Dr. Mons's account is thoroughly intelligible: it does not conceal the difficulties of using the test, nor introduce unnecessary complications. On the other hand, it does not offer convincing evidence on the test's reliability or validity. This is not a criticism of Dr. Mons, however, since the extremely wide scope allowed for personal interpretations of results makes it impossible to produce general evidence of that kind. Some will feel that the use of the Rorschach test is as far removed from scientific psychology as palmistry or graphology; but this implies no disrespect, for the practitioner who has made an extensive study of human hands can learn a great deal about a man's character from the pair presented to him, especially if he is skilful in the conversation he makes in the meantime. The Rorschach expert conducts his test in the same way, using all the additional information he can assemble to help him in interpreting the result. Can we, then, safely attribute to the test the successes achieved by the skilled practitioner, or blame it for the failures and indiscretions of the unskilled? Is it not, perhaps, a measure of the examiner rather than the examined?

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THE LANCET

LONDON: SATURDAY, APRIL 17, 1948

The Fourteen Points

Mr. BEVAN's statement of April 7 was welcomed by the British Medical Association "as affording the opportunity for a re-examination of the points in dispute," and last Monday six B.M.A. delegates met him to discuss these points in detail. The questions they asked, and the Minister's replies, which are printed on p. 606, were placed before the council on Wednesday, and it is understood that a new plebiscite will soon be taken to ascertain whether members of the profession will be prepared to participate in the National Health Service now that they have these new assurances. An amending Act is to dispose of the possibility that a whole-time salaried service might be introduced by regulation, and the basic salary is to become optional: the practitioner entering after July 5 will receive it for three years, but will then be free to decide whether it shall continue—except that, rather paradoxically, the B.M.A. now favours limitation of his choice. Particularly heartening is the categorical statement that every doctor will have complete freedom to publish his views on the organisation and administration of the service. The Minister, while declining to deprive the Medical Practices Committee of its right to forbid new entries to public practices in one of the areas designated as "over-doctored"—which are likely to be very few—agrees to review this feature of his scheme after two years. Answering objections to the proposal to limit midwifery to doctors whose names appear on a local list, he fairly points out that this arrangement accords with the recommendations of a committee established in agreement with the Negotiating Committee.

By his genuine (and difficult) effort to secure happier relations with the profession, Mr. BEVAN has evoked from the B.M.A. a series of constructive questions, which in turn have elicited reasonable answers. We hope that further study may yet be given to the suggestion that special procedure should be devised for scrutinising regulations under the Act: if, on fuller explanation, the idea of a special parliamentary commission does not impress the Minister, it might be worth considering whether regulations could not be regularly referred in draft to a standing committee of the Central Health Services Council, on the analogy of procedure under the National Insurance Act. Mr. BEVAN is right, however, in saying that administration through regulations has at least the merit of flexibility: if the rules can be readily revised there is a much better chance of rapidly correcting initial errors. This is all the more important because, with July 5 so close, it has now become impracticable to go over the whole scheme again in detailed negotiation. Nevertheless there are still a few important questions which, in an atmosphere of coöperation, could be usefully discussed before the appointed day; and we trust that the publication of these Fourteen Points will be quickly followed not merely by an armistice but by the common endeavour on which the good of the service so obviously depends.

Anticoagulant Therapy

IT is six years since dicoumarol, whose anticoagulant action had been discovered by K. P. LINK and his associates, was first used in practical therapeutics. Heparin had been used for some time, but it was the introduction of dicoumarol that made it feasible to reduce the coagulability of the blood for days or weeks on end with reasonable constancy. Dicoumarol is given by mouth once a day or even less often; heparin must be given intravenously every 4 or 6 hours. The success of dicoumarol, if its action could be controlled, was therefore assured; and its applications and the difficulties that have arisen therein have been noticed in these columns from time to time.[1] It is now possible to form a balanced view of the value of anticoagulant treatment and the best methods of administration and control. Such an assessment has recently been made by ALLEN and his colleagues[2] at the Mayo Clinic on the basis of their experience with over 2000 cases.

One of the properties of dicoumarol is that its full action takes 48 hours to develop. Consequently, if an anticoagulant effect is needed quickly, most workers give heparin as well as dicoumarol for the first 48 hours. ALLEN recommends an initial dose of 300 mg. of dicoumarol and 200 mg. on the second day; no more must be given unless the prothrombin concentration is still above 20% of normal; if the prothrombin is over 20% a further 200 mg. is given daily until the level falls below that figure. Success in control and the avoidance of accidents clearly depend on accurate daily estimations of prothrombin. For this type of control an estimate of prothrombin concentration gives more certain results than a bare statement of the "prothrombin time." The relation between prothrombin time and concentration is not linear; so in practice the clinician must work with a clinical pathologist who has a standard technique and who has prepared a graph showing the exact relation—by his technique—of prothrombin time and concentration. In clinics that have not these facilities dicoumarol treatment may be hazardous and liable to unpleasant surprises. Hæmorrhage is the only complication of dicoumarol treatment to be feared. In ALLEN's 1983 postoperative cases, epistaxis, local ecchymoses, hæmaturia, or other minor hæmorrhages were present in 3·4%; serious bleeding occurred in 1·8%, and there were two fatal cases—but it is not certain that dicoumarol was the sole cause of these deaths. The risk is thus small but definite; even expert control cannot avoid it completely. ALLEN does not regard the minor hæmorrhages seriously and continues giving dicoumarol if the prothrombin concentration is not too low. For the serious hæmorrhages 60 mg. of menaphthone (synthetic vitamin K) is given intravenously 2-hourly for 1–3 doses, together with transfusion of fresh blood to replace the blood lost. In Turin GALEONE and ROMAGNOLO[3] have investigated various substances that antagonise the action of dicoumarol and have found that 100–200 mg. daily of nicotinamide, especially when combined with ascorbic acid, gives the best results—better than

1. *Lancet*, 1943, i, 621; 1944, ii, 412.
2. Allen, E. V., Hines, E. A. jun., Kvale, W. F., Barker, N. W. *Ann. intern. Med.* 1947, 27, 371.
3. Galeone, A., Romagnolo, A. *Minerva med.* 1948, 1, 169.

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vitamin K. Nicotinamide, it is claimed, can reduce the action of dicoumarol by two-thirds, whereas vitamin K only halves the effect. The site of this protective action is thought to be the liver. The clinician must know how to deal with dicoumarol hæmorrhage because we have unfortunately no means of picking out the one patient in fifty who is going to bleed to a serious extent.

Reports on the applications of anticoagulant treatment have come from many sources. In surgery it has been used as a preventive measure in those operations, like abdominal hysterectomy, which are peculiarly prone to thrombotic or embolic complications. It has been used as an emergency measure to prevent the spread of venous thromboses and pulmonary embolism. In postpartum venous thrombosis in the legs this treatment has accelerated recovery, reduced invalidism, and prevented spread; but in this country the wider application of anticoagulant treatment in obstetrics is undoubtedly hampered by the lack of proper laboratory help. In the medical wards dicoumarol treatment has been applied to a variety of blood-vessel diseases, such as acute and recurrent thrombophlebitis, and ALLEN notes that in his series of 288 medical cases hæmorrhagic incidents were less frequent than in the surgical cases (0·66% minor bleeding, 1·0% serious bleeding) and all recovered when appropriately treated. The Mayo Clinic workers consider that the heparin-dicoumarol treatment of acute myocardial infarction due to coronary thrombosis gives encouraging results if begun soon enough,[4] but this is the latest application and a final decision on its value must wait awhile. It is clear then that anticoagulant treatment has come to stay and that its field of usefulness is being extended. But it must be properly controlled, with full understanding of the dangers.

Surgical Treatment of Hypertension

IN 1827 RICHARD BRIGHT put forward the hypothesis that arterial hypertension was always caused by disease of the kidney. This view was challenged by WILKES (1853), GULL and SUTTON (1872), and ALLBUTT (1906), who also coined the term "essential hypertension"; but VOLHARD and FAHR (1917) still contended that the disorder arose from renal dysfunction. Today, with more facts at our disposal, the argument continues unabated. Support of the kidney hypothesis was provided by GOLDBLATT[5] when he showed in 1934 that hypertension could be produced experimentally, without any change in excretory function, by the partial constriction of one or both renal arteries. Subsequent work in many centres proved that these ischæmic kidneys liberate a substance, renin (first isolated in 1898 by TIGERSTEDT and BERGMAN[6]), which combines with plasma to form an active pressor substance, "angiotonin" or "hypertensin." This led to the treatment of high blood-pressure by removal of the unilaterally diseased kidney or to denervation in an attempt to improve its circulation. Unfortunately the hopes engendered by early reports have not been sustained; and many agree with HOMER SMITH[7] that "so far as the genesis of hypertension is concerned, the kidney appears to be the victim rather than the culprit." It has, however, become clear that hypertension, whether it be "idiopathic" or associated with primary vascular disease or neurogenic, renal, or endocrine dysfunction, is accompanied by generalised vasoconstriction. It is also clear that essential hypertension, which probably accounts for 80% of the cases, may have phases of acceleration and intermission, its progress being sometimes so slow that expectation of life is not materially altered.

It is against this background of uncertainty that the surgical treatment of hypertension has been further developed. The major attack has been on the sympathetic nervous system—a procedure first suggested in 1923 by DANIELOPOLU,[8] BRUNING,[9] and PENDE,[10] but chiefly developed by American workers, including CRAIG, ADSON, ALLEN, DE TAKATS, PEET, CRILE, SMITHWICK, and GRIMSON. The purpose of all such operations has been denervation of the splanchnic arterial tree in either one or two stages. The one-stage supradiaphragmatic operation devised by PEET[11] consists in bilateral resection of the greater splanchnic nerves, the sympathetic ganglia and rami of the VIIIth–XIIth thoracic segments, and the lesser and least splanchnic nerves arising from them; in SMITHWICK's[12] two-stage dorsolumbar sympathectomy lumbar segments I and II are also resected. The operative mortality has varied between 2% and 4%—which is remarkably low when the severity of the operation and the poor operative quality of the patient are considered. More recently GRIMSON[13] has performed total sympathectomies, but results so far published would not seem to justify the extra risks. The most usual complications of sympathectomy are pleural effusion, which rarely gives rise to anxiety, and pain or neuritis at the operation site. Postural hypotension is sometimes troublesome but usually passes off after a few months. In men sterility may ensue; and POPPEN and LEMMON[14] say that after operation a fifth of their male patients lost the power of ejaculation.

Operations on about 4000 cases have now been reported. Using the method adopted by KEITH, WAGENER, and BARKER[15] many assess their cases by eyeground changes. Grade 1 comprises those with minimal arteriovenous nicking and a varying raised blood-pressure; in grade 2 are those with more pronounced eyeground changes and a more fixed raised blood-pressure; grade 3 includes cases with hæmorrhage and exudates in the fundi and with incipient renal, cardiac, or cerebral failure; while in grade 4 there is papilloedema. PEET[16] has claimed a useful reduction in blood-pressure in about half the 1500 patients operated on since 1933 and followed for from one to twelve years; of patients surviving between five and twelve years after operation, 1 in

4. Parker, R. L., Barker, N. W. *Proc. Mayo Clin.* 1947, **22**, 185.
5. Goldblatt, H., Lynch, J., Hanzal, R. F., Summerville, W. W. *J. exp. Med.* 1934, **59**, 347.
6. Tigerstedt, R., Bergman, P. G. *Arch. Physiol.* 1898, **8**, 223.
7. Smith, H. *Bull. N.Y. Acad. Med.* 1943, **19**, 449.
8. Danielopolu, D. *Bull. Soc. méd. Hôp. Paris*, 1923, **47**, 778.
9. Bruning, F. *Klin. Wschr.* 1923, **2**, 777.
10. Pende, N. *N.Y. med. J.* 1923, **118**, 469.
11. Peet, M. M. *Calif. Acad. Med.* 1935–36, **5**, 58.
12. Smithwick, R. H. *Surgery*, 1940, **7**, 1.
13. Grimson, K. S. *Ann. Surg.* 1941, **114**, 753.
14. Poppen, J. L., Lemmon, J. *J. Amer. med. Ass.* 1947, **134**, 1.
15. Keith, N. M., Wagener, H. P., Barker, N. W. *Amer. J. med. Sci.* 1939, **197**, 332.
16. Peet, M. M. *New Engl. J. Med.* 1947, **236**, 270.

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5 had a normal blood-pressure, whilst in the whole series 8 out of every 10 were enabled to return to work. Other workers [14 17 18 19] have reported results of the same order; common to all reports has been relief from incapacitating headaches and giddiness and the disappearance of papillœdema and exudates in at least 80% of patients where these were present before operation. KEITH and his associates reported that in malignant hypertension mortality was maximal in the first two years after operation; of 146 cases only 1 survived four years. PEET has operated on 112 such cases; 19 were alive and well at periods varying from five to eleven years later; and similar results have been obtained elsewhere. HAMMERSTRÖM [19] found that operation slightly improved the prognosis in non-malignant hypertension, especially in men. From a small series PALMER [20] concluded that operation offered a definite improvement in prognosis for grade 4 hypertensives, and slight improvement for the remainder. A more objective evaluation is obtainable by the electrocardiograph. FILLEY [21] found that all of 44 hypertensives with left ventricular strain were dead within four years, while PAUL WHITE [22] showed that the chances of this change being reversed were about one in ten. With dorsolumbar sympathectomy, however, improvement is obtained in two-thirds and the electrocardiograms became normal in one-third.

The question of which cases may expect benefit is still unanswered. SMITHWICK excludes from operation those with congestive cardiac failure, renal impairment, cerebral vascular accidents, and hypertensive encephalopathy, and some with malignant hypertension; ALLEN and ADSON [23] agree that congestive heart-failure, angina pectoris, or severe hypertensive encephalopathy are contra-indications. PEET accepts patients below the age of 54 with a blood-pressure continuously above 170/105 mm. Hg, a well-compensated heart, and normal cerebral function; he holds that any case of malignant hypertension should be operated upon. PALMER thinks operation the only hope in malignant hypertension; it should be offered, he says, to grade 1 cases where continued observation shows progressive increase in blood-pressure, but he is not convinced that operation is helpful to cases in grades 2 and 3. In this country surgical treatment is generally reserved for seriously ill patients with a history of cerebral vascular upsets, incipient or long-standing cardiac failure, incapacitating headaches and vertigo, malignant hypertension, and, especially, of visual failure from papillœdema and hæmorrhages. Doubt has been expressed about the advisability of operation in grades 1 and 2; and hypertension without symptoms and found by chance is not regarded as an indication for operation unless observation shows a rising blood-pressure and signs of incipient renal, cardiac, or cerebral failure. Most American workers, on the other hand, prefer to operate in the earlier stages before the rise in blood-pressure becomes fixed and complications develop. The eventual place of surgery in the treatment of hypertension will not be defined until the fundamental ætiological factors are known. Meanwhile the need is for better knowledge of prognosis in the non-operated cases with moderate hypertension, and of the reasons for the varying results of operation. There is, however, ample evidence that sympathectomy often diminishes peripheral resistance. In some cases of malignant hypertension it gives dramatic results; in a few cases it provides temporary or even permanent stay in the course of the illness; while in the majority it offers relief from symptoms.

17. Smithwick, R. H. *Ibid*, p. 662.
18. de Takats, G., Graupner, G. W., Fowler, E. F., Jensik, R. J. *Arch. Surg.* 1946, **53**, 111.
19. Hammarström, S. *Acta med. scand.* 1947, suppl. 192.
20. Palmer, R. S. *J. Amer. med. Ass.* 1947, **134**, 9.
21. Filley, G. F. *Bull. Johns Hopk. Hosp.* 1946, **74**, 261.
22. White, P. D., Smithwick, R. H., Mathews, M. W., Evans, E. *Amer. Heart J.* 1945, **30**, 165.
23. Allen, E. V., Adson, A. V. *Ann. intern. Med.* 1940, **14**, 289.

Annotations

DEDUCTIO AD ABSURDUM

WHICH university had the privilege of educating Sherlock Holmes? Or rather providing the medium in which his peculiar talents developed, for a while, according to their own laws of growth? Opinion at the Royal Society of Medicine was divided, on April 7, when the section of history met to discuss the relationship of Conan Doyle and Dr. Joseph Bell to the most remarkable of detectives.

Mr. S. C. Roberts, the guest of the section, demolished Miss Dorothy Sayers's published view that Holmes was a Cambridge man—indeed, an undergraduate at Sidney Sussex, whose name appears on the college lists of the time. It is clear, he said, that Holmes knew nothing of Cambridge. He even referred, on one occasion, to a late train leaving London at 11.15—which, as Mr. Roberts pointed out, would be quite useless to any Cambridge man. Moreover, Holmes talked of "running down" to Cambridge, and once made use of the Trinity drag-hounds, animals whose very existence is questionable. The mere fact that he was bitten in the leg by an undergraduate's bull terrier while on the way to chapel (the incident on which Miss Sayers founds her case) is not conclusive. True undergraduates are not allowed to keep dogs in college, which suggests that Holmes was living out at the time: and true the first-year man at Cambridge lives out while the Oxford freshman lives in; but may he not, Mr. Roberts suggests, have been an Oxford man who stepped across the road to buy some shag on his way to chapel? As for the Mr. Holmes whose name appears on the list of Sidney Sussex, he became a canon of Wells Cathedral, and the author of a work entitled *The Parish and Manor of Wookey*.

Mr. Zachary Cope, in a digression on Dr. Watson (whose life has been so brilliantly written by Mr. Roberts), pointed out that Watson was not really so dumb as he is obliged to appear beside Holmes. His qualification (which Holmes on one occasion disparaged) was no less than the M.D. Lond.; and if he knew nothing, as Holmes scornfully reminded him, of "the black formosa corruption," what did the distinguished gathering now met to discuss him know of that rare disease?

Dr. Douglas Guthrie in a scholarly review of the lives of Dr. Joseph Bell and his forbears made it clear that it was only in his remarkable ability for deduction that this great teacher resembled Holmes. Such phrases as "You see, you do not observe" may well have originated with Bell; but the untidiness, the violin, the cocaine, the indoor revolver practice, and the malodorous chemical experiments were foreign to him. They might be taken as evidence (though Dr. Guthrie did not say so) of the separate existence of the great detective. On the question of how Holmes learnt the characteristics on which he based his deductions, Dr. Trevor Howell suggested that he must at one time

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have had the run of an outpatient department, where he could examine the patients' cards. Since we know that for a while he was making chemical studies at Barts, it is likely that he was on terms with the casualty officer.

Sir Arthur MacNalty, who took the chair, gave an able account of Conan Doyle's adventurous life: it seems he was responsible, among other remarkable things, for introducing ski-ing into Switzerland.

PENICILLIN AND SYPHILIS

IN a superlatively chronic disease such as syphilis the assessment of a therapeutic agent is difficult. Since some early cases recover after what is known to be inadequate treatment, or sometimes after none at all, very large numbers of cases must be followed before any useful conclusions can be reached. Such a systematic study was begun in the United States by the National Research Council in 1944, and at the beginning of 1946 was taken over by the United States Public Health Service. The research is nation-wide and includes not only cases treated in naval, military, and public-health clinics, but also those from the best-known general hospitals in the country.

In a recent monograph,[1] Dr. Earle Moore presents a critical balance-sheet of the position as he saw it at the end of 1946. He is fully alive to the fluid nature of the situation and he urges the physician who uses the book as a guide to keep a weather eye cocked on published work for more up-to-date information. Meanwhile it appears that, contrary to expectation, relapse-rates in early syphilis treated with penicillin are not worsening with the lapse of time, which suggests that a majority of such infections, whether acquired or congenital, can be cured by a short course of penicillin alone. On the other hand, the minority remains large, for Dr. Moore[2] himself pointed out at the Royal Society of Medicine last July that the failure-rate of penicillin treatment of early syphilis was 25–30% after 18–24 months' observation. The progress of syphilitic disease of the nervous system can often be arrested by penicillin, and this remedy is nearly 100% effective in the prevention and cure of prenatal syphilis. From the public-health angle, it is important that most early syphilitics can be made non-infectious before the patient defaults. This promises a rapid fall in the incidence of fresh infections, particularly if the present policy of contact-tracing is maintained and intensified. But the efficacy of penicillin in late and latent syphilis calls for prolonged investigation. What matters, as Dr. Moore points out, is what happens to the patient, not what happens to his blood test; so he must be followed up for a literal lifetime.

Cardiovascular syphilitics are notoriously bad lives, and it should therefore be possible to assess the value of treatment quickly in such cases. It is noteworthy that Herxheimer reactions in cardiovascular disease need not be greatly feared. At the Johns Hopkins Hospital, 50 patients with saccular aneurysms or aortic incompetence had been treated with penicillin by the end of 1946—half of them with the small initial dose of 1000 units gradually increased to an average therapeutic dose, and the remainder with doses of 50,000 or 100,000 units from the start. In neither group was there an exacerbation of symptoms, nor was there any change in sedimentation-rates, temperature, leucocyte-counts, or electrocardiographic readings. It thus seems possible that the menace of cardiac shock after strenuous initial treatment may turn out to be fanciful. Probably, however, though treatment may be able to arrest the infective process in cardiovascular syphilis, the ultimate prognosis can never be good once the damage has produced clinical and radiological signs.

Penicillin treatment of gonorrhœa is now almost universal, and Dr. Moore is fully alive to the danger of a concurrent syphilitic infection being masked or modified by what must be in most cases subminimal treatment for syphilis. He quotes the opinion of Leifer and Martin that "clinical and serologic observation for ninety days from the date of treatment would suffice to detect all but the most exceptional cases of syphilis," but in a footnote he advances this period to at least 4 months. Though in this country blood tests are advised 3 and 6 months after treatment, the early default-rate, particularly among men, is high, and some of these defaulters are no doubt doubly infected. The number, however, must be small, and with a diminishing incidence of syphilis would become smaller still. It is significant that in the United States, where syphilis is far commoner than it is here, it has been decided not to withhold penicillin in gonococcal infections.

1. Penicillin in Syphilis. By JOSEPH EARLE MOORE, M.D. (Johns Hopkins). Oxford: Blackwell. 1947. Pp. 319. 27s. 6d.
2. *Proc. R. Soc. Med.* 1947, **40**, 813.

A UNIT OF RHEUMATOLOGY

RESEARCH on rheumatism in special wards, which we discussed on March 27, is illustrated by the work of the Royal Free Hospital Unit of Rheumatology. Formerly the British Legion Unit of Rheumatology, it was started through the energy of Dr. C. B. Heald; last June it was moved from the country to the Lawn Road (L.C.C.) Hospital at Hampstead, and became a unit of the Royal Free under Dr. Ernest Fletcher. Between June and November it carried 50 beds, but on Dec. 1 the number was reduced to 40, half for men, half for women. During the first seven months, 175 patients were admitted and 132 discharged; and of these discharged patients no less than 60 (45%) returned to their ordinary work, while 14 (11%) who were bedridden on admission walked out and 2 of them returned to work. Of the remainder, 37 (28%) were improved, and only 18 (14%) were not. Naturally these figures must be corrected in terms of the relapse-rate, but they show how often chronic locomotor disorders respond to treatment in favourable surroundings.

The factors which make these surroundings favourable are easily analysed. First, patients get expert treatment over a long period: and they get it in a pleasant atmosphere of personal rivalry and competition which is a mainspring of recovery. Then the nursing staff are of the highest possible quality, combining special technical skill with devotion to the sick. The physiotherapists are equally keen and competent, and the doctors are encouraged to maintain their interest in general medicine lest they should become overspecialised. Finally, the unit is engaged in active research, though here it has been hampered to some extent by lack of tools. The physiotherapy department was not fully organised until September, and it has still not been possible to instal X-ray apparatus, which means that patients have to go to Gray's Inn Road for radiography, at the cost of time and energy. The research programme has included sacro-iliac biopsies to determine the pathology of the "sacro-iliitis" which precedes ankylosing spondylitis, and a pilot experiment to determine the value of transfusion of pregnant women's blood in the treatment of rheumatoid arthritis; studies are also being made of the cerebrospinal fluid in this disease. The nature and extent of the vascular component is being examined in cases of brachial neuralgia, and special attention is being given to the costoclavicular syndrome.

Dr. Fletcher notes in his report that since only 2 patients of the 14 who were bedridden on admission returned to work, the likelihood of full recovery once the patient has taken to his bed is not great. But 34 out of

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59 patients with rheumatoid arthritis who were not bedridden returned to full work—a proportion which he thinks may be unique. It is noteworthy that 7 patients admitted as cases of arthritis proved to have no locomotor lesion: but though they were warded with true arthritics and repeatedly reassured, they still believed themselves to be victims of the disease. Only one failed to improve, however, though only one returned to full work. The bonds between mind and body in this group of diseases seem to be especially strong and close.

BLINDNESS IN THE COLONIES

THE Colonial Office has issued a report on Blindness in British African and Middle East Territories,[1] written by a delegation of three members who were sent to Cyprus, Palestine, Aden, East Africa, and West Africa soon after the end of the war. The expenses of the delegation were borne equally by the Government and the National Institute for the Blind.

The delegation point out that the absence of reliable census and mortality figures in tropical countries is an enormous disadvantage in assessing the prevalence of blindness, as of all diseases. They recognise that the African is suspicious of activities involving enumeration of the population, and is bound by customs which may wreck otherwise careful plans for survey work. To some, for instance, a blind child is a disgrace, to be concealed. Nevertheless, they advise that in the course of sleeping-sickness surveys in West Africa notes should be made, on the forms used for record, of such blind persons as are seen. If this is done, much valuable information will no doubt be obtained, and even if the sleeping-sickness position becomes such that survey teams are no longer needed, and therefore the opportunity for collecting facts on blindness disappears, the surveys made will retain a permanent value. But the reader may ask, why sleeping-sickness and blindness only? There are many other important conditions which could be assessed in the course of survey work more satisfactorily than from hospital and dispensary figures. In the Belgian Congo the great Foréami organisation has since 1931 been examining, and making records of, the whole population of certain areas, and a picture is gradually emerging of the health and social conditions of the people, more accurate and comprehensive than any obtainable by other means. Similarly, in Nigeria, the effort expended in resettling the population of Anchau corridor, now rendered free from tsetse flies, has involved close observation of the people and study of their customs; in such a settlement there is probably the opportunity to institute a system of medical supervision and registration which would provide a mass of information now lacking. On the other hand, it would obviously be possible to gather information on blindness, by comparatively simple means, when comprehensive surveys are not possible, and this is what the present report advises. Propounding a scheme for a blind welfare service, its authors suggest control by a council on blindness, with an advisory board, and an inter-territorial organisation. Voluntary organisations such as missions would play a part, and there would be three sources of funds—the Imperial Treasury, the funds of the local government, and voluntary contributions. A register (described as "the heart of any comprehensive and methodical scheme for the welfare of the blind") would be compiled. Eradication of the causes of blindness is a matter for economic, educational, and health activity, while the treatment of patients with the relevant diseases is a matter of medical organisation. The delegation were well aware that in both these activities most of the countries concerned are able to do little more than touch the fringe of their problems. Travelling eye dispensaries may do great work in the field, but once more the argument for dispensaries or teams, equipped to deal with all diseases rather than with one set only, obtrudes itself on the reader.

Although the report contains some discussion of the diseases implicated in blindness, it does not profess to be a medical treatise: none of the authors (one of whom is himself blind) are medically qualified. Instead, it is a record of facts and opinions carefully gathered from many sources, and an attempt to suggest the beginnings of a solution of a most distressing and much too common problem. As such it is admirable, maintaining an impressively high standard throughout.

1. By Douglas F. Heath (Colonial Office), and Mary G. Thomas and John F. Wilson (National Institute for the Blind). H.M. Stationery Office. 1948. Pp. 99. 2s.

THE B.M.A. AND NURSING

COMPARED with other comments on the Working Party's report, those of the B.M.A. council[1] show less desire for radical changes in the organisation of nursing. "The association deprecates the implication that the whole disciplinary system of hospitals is 'outworn.'" It does not accept the view that if the student were relieved of domestic work and of nursing duties dictated solely by the staffing demands of the hospitals she would be able to complete a general training in two years, and it thinks the waste of time in the performance of domestic and nursing duties has been grossly exaggerated. While claiming to agree entirely with the definition of student status supported by the King's Fund[2] the council nevertheless "does not accept the proposal of student status as understood by the Working Party"—though the two do not necessarily differ, as the King's Fund pointed out. Nor does the council favour the emphasis placed on social and preventive training: "the primary function of a nurse is to care for the sick, not to reduce the incidence of sickness."

In place of the regional nurse training board to plan and coördinate training, the B.M.A. council proposes that there should be a regional advisory board with no executive functions, and that any pioneer units in nurse training should be set up "at the hospital management committee level and not at the regional level." Instead of the pioneer unit being under a director or principal and an education committee, as the Working Party proposed, the association holds that the sister-tutor should be in full charge of theoretical training, and answerable through the matron of the parent hospital to the management committee. The education committee would thus shrink to a standing advisory committee composed of members of the hospital management committee, the medical staff, a matron of a parent hospital, "the chief nurse educationist" (who is not otherwise defined), and representatives of girls schools. Inspection of training units should be a function, it is suggested, not of the Ministry of Health but of the General Nursing Council. Grants should be paid to student nurses "in the preclinical stage"—that is, presumably, while they are in the preliminary training school, or taking pre-nursing courses—but during clinical training they should receive a salary from the hospital: "this is essential if the hospital is to exercise the control over the trainee which its legal responsibility for her actions makes desirable."

The B.M.A. council announces that it is "drawing up constructive proposals as to an alternative scheme of training." Students of the nursing crisis will await this with interest rather than lively hope.

1. Comments of the council of the British Medical Association on the report of the Working Party on the Recruitment and Training of Nurses. *Brit. med. J.* suppl. April 10, p. 97.
2. See *Lancet*, Jan. 10, p. 69.

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THE ACT AND THE PROFESSION

Minister's Replies to B.M.A. Questions

THE Minister of Health and the Secretary of State for Scotland have considered the fourteen questions which the British Medical Association sent to them on April 8 and which were discussed with representatives of the association on April 12. A summary of their replies is set out below. (The word "Minister" should be read as also covering the Secretary of State.)

1. The Minister stated in the House of Commons that the Government proposed to make it impossible to institute a full-time salaried service by regulation alone. The profession welcomed that statement. Would the Minister indicate how it is proposed to do this: first, in relation to general practitioners, and second, in relation to hospital staffs?

There has not yet been time to work out the actual wording of the new measure, and when he does so the Minister will welcome the help of the profession.

For general practitioners the proposed effect of the new provision will be that they are paid entirely by capitation fee, except for the new practitioner in his opening three years and any other practitioner who himself opts to have a fixed annual element in his salary with the rest on a capitation basis. The question of conditions under which that option should be exercisable is mentioned under question 8 below.

As to hospital staffs, there seems to be some misunderstanding. The "regulation versus statute" issue does not arise in the same way in their case; nor does that of "capitation versus salary or sessional fee." Hospital appointments (usually part-time for specialist staff) will be offered, by advertisement or otherwise, in the ordinary way, and people will accept them or not as they choose; there is no kind of compulsion nor any power of compulsory transfer to other areas or hospitals. If any regulations are made under section 66 of the Act the Minister will exclude from them any provision for universal whole-time specialist services. Appointments of specialist staff will rest with regional boards and the boards of governors of teaching hospitals, and there will be special professional advisory machinery for advising on the suitability of applicants—in the manner often previously explained. (As to existing staff, see 6 below.)

2. As this proposed step in its relation to hospital staffs would appear to involve a policy of keeping whole-time consultant and specialist appointments to a minimum, would the Minister agree to preserve, to the extent to which the public desires it, existing private accommodation as such so as to make possible the continuance of the part-time system of consultant and specialist staffing of hospitals?

It has always been anticipated that consultant and specialist appointments should in most cases be part-time, and—where appropriate—at more than one hospital. They are essentially a regional and not a local management committee affair. As to private pay-bed accommodation, this has been promised under the scheme and is expressly provided for in the Act. It is to be assumed that at the outset of the scheme it will lie where it is at present, but obviously the Minister cannot tie himself or the future hospital bodies to an exact future distribution now. The main point is that the continuance of part-time specialists at hospitals accords with the intention of the scheme, and there will therefore be facilities for them.

3. Would the Minister state what assurances exist or can be given that hospitals or similar establishments not taken over on the appointed day or later established privately will not subsequently be the subject of compulsory purchase under the Act?

For obvious reasons the Minister could not give such an assurance. A particular building might become essential to the new service, and that applies to any building (whether at present used for medical purposes or not). But the acquisition by purchase of, say, nursing-homes or excluded hospitals is not in prospect. The exclusion by the Minister of 200 hospitals recently, indeed, is direct evidence to the contrary, and he would scarcely exclude a hospital first and then acquire it by purchase afterwards (and, once excluded, it could only be acquired by purchase).

If any private concern were later to contemplate spending money on a private hospital or home run for profit, and feared that the Minister would wait for it to be there and then use compulsory purchase powers on it, obviously the sensible course would be first to discuss the project with the Minister at the time, and the Department ought certainly to be ready to indicate its likely attitude straight away. The private concern would then know where it was.

4. Does the Minister agree that it should be required that in relation to every hospital there should be a medical committee; that such medical committees should be represented by their own nominees on boards of governors or hospital management committees, enjoying the full status of membership of such bodies; that in the case of teaching hospitals the medical committee should be representative of all consultants and specialists on the staff, teachers and non-teachers?

The Minister entirely agrees with the system of medical committees in hospitals. But he could not *compel* medical staffs to set them up (nor would the association presumably wish him to try!). He has already included in his guidance to regional boards and hospital management committees a declaration of the importance which he attaches to the system and asked that every encouragement and facility should be given to it. He also agrees that in teaching hospitals such committees should be representative of all consultants and specialists on the staff, whether they are teachers or not.

As to the representation of medical committees on boards of governors or hospital management committees, the Minister follows the Act, which requires the latter bodies to include persons appointed after consultation with the senior medical staff of the hospital or hospitals, and the former bodies to include up to one-fifth of their members nominated by the medical and dental teaching staff. In practice, of course, this means that both bodies will include members of the medical committees, with full membership. Moreover, the Minister certainly thinks that consultation should include consultation with the medical committee, where there is one.

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5. Will the Minister extend his assurance on the subject of freedom of speech and publication within the new service to include not only such freedom on professional and scientific matters but also the right of criticism on matters of administration?

The assurances already given cover complete freedom to publish views on the organisation and administration of the service, as well as on clinical matters, without obtaining any prior consent to do so.

6. Would the Minister state what security in relation to their hospital appointments will be enjoyed by existing members of hospital staffs at the time of taking over and by hospital staffs subsequently? Does the Minister contemplate the establishment of machinery for the investigation of complaints, including the right of appeal against any decision of the board of governors or regional hospital board?

In practice on the appointed day the existing staffs of hospitals will be taken over by the regional hospital boards. Thereafter it will be the duty of the boards to review the specialist services of their regions and they will offer new appointments to their staffs either in their existing or other hospitals, which they will be free to accept or refuse as they will. (See also question 1.)

As to the latter part of the question, medical staffs of hospitals will be in the same general position in these respects as they are now. They will have all normal remedies for unlawful termination of any engagement, and in addition their medical committees and a Whitley machinery to help protect their interests. It will be a proper function of the Whitley organisation to devise machinery for the ventilation of complaints and grievances.

7. Will the Minister indicate his view on the second resolution of the Royal College of Physicians, viz.: "A principal cause of the present discontent with the National Health Service is the power possessed by the Minister of Health to change its character by regulations. The college therefore suggests that an amending Bill should be introduced, to make regulations affecting the National Health Service subject to special procedure."

It is not clear what is meant by this resolution, which does not explain—for instance—what "special procedure" it has in mind. Already all regulations have to be examined by a special committee in Parliament to decide whether they go beyond the scope of the Act under which they are made or whether there is any feature of them so unusual or important that the special attention of Members should be drawn to it.

Any main cause of apprehension about regulations under the Act has been removed by the undertaking to remove a full-time salaried general-practitioner service from their scope. For the rest of their purposes under the Act, it seems to the Minister that regulations have advantages which the association is overlooking. For example, it could only be detrimental to the doctors' interests if, every time some increase in capitation fee (as recently under the old Act) became desirable owing to changing conditions, it depended on finding Parliamentary time for a new Act to give effect to it. The use of regulations for things which require frequent flexibility has been familiar under the old National Health Insurance Acts for about 36 years, and has not—the Minister believes—been found anything but advantageous to the doctor.

8. The committee, while welcoming the abandonment of the universal basic salary, submits to the Minister the following points for consideration:

It is accepted that there are circumstances in which some practitioners need regular annual payments of the kind suggested; the amount of such payments will vary with different practitioners according to the circumstances under which they work. In some cases such annual payments should be for a period, in others permanent. The committee suggests that the object the Minister has in mind of enabling practitioners needed in an area to practise there will be served more efficiently and economically if such payments are made on the recommendation of the local executive council according to the circumstances of each case. In this way such payments will not be made to practitioners who do not need them, and where they are made they will be related to the actual needs revealed by the individual case. Will the Minister accept this modification of his own proposal?

The local executive council will certainly be consulted on the need for any variations of additional fixed annual payments to meet the needs of doctors practising in different areas.

The Minister understands, from the discussion on April 12, that what is in mind is that there will be various kinds of case where a doctor could—by taking the £300 system—profit financially himself from the equivalent of a higher rate of remuneration per patient at the expense of other doctors. The association feel that while this is justified wherever there is need in the individual case, there will be other cases where there is no such need and where the results might be unfair—and that therefore there should be some other check on the decision than the unrestricted opting of the doctor. Within the scope of his recent declaration in the House of Commons the Minister is perfectly willing to discuss with the profession all the details of the conditions and methods through which opting will be conducted.

9. The profession is anxious to coöperate with the Minister in remedying any defects which may exist in the distribution of general practitioners in relation to the needs of the population. Their representatives have argued that the introduction of a service available to all will of itself go a long way towards the solution of any problems which may exist, any residual problem being met by the Minister's power to appoint practitioners to under-doctored areas. The Minister has agreed that there are likely to be few areas where the question of consent to new participants in the service will arise. Bearing in mind the profession's dislike of the proposed limitation of movement, coupled with its desire to solve any existing problem of distribution, it is suggested that the introduction of the scheme laid down in the Act should be postponed for an agreed period, in order that it may be determined by experience whether the problem does in fact largely solve itself or whether the operation of the provisions of the Act in this respect is necessary. During such period the profession will gladly establish an advisory machinery to keep practitioners informed of available appointments and opportunities. Will the Minister agree to such a deferment?

The Minister cannot agree to this further alteration of the Act, which would in any case be administratively difficult at a time when the settlement of succession to practices by sale and purchase is ceasing. The more reasonable course seems to be a review of the working of the system after an agreed period, during which it can be seen if it is as irksome as the associa-

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tion seem to anticipate. The Minister is quite prepared to agree that there shall be a special review of the usefulness of this feature of the Act in, say, two years' time.

10. Would the Minister agree to request the Lord Chancellor to appoint a High Court judge to the chairmanship of the tribunal?

The Minister has already given an assurance that the chairman of the tribunal shall be a lawyer of high standing, appointed by the Lord Chancellor. He cannot agree to stipulate that he shall be a High Court judge. For one thing, it is too restrictive; it might well be very difficult to be sure of being able to secure the services of a judge at any particular time. For another, a judge, so appointed, would not be acting as a judge when conducting the tribunal—but simply as a lawyer of high standing, which the Minister has already promised.

11. The profession urges the preservation of the ownership of goodwill in general practice because of the essential professional freedoms which it safeguards. Will the Minister indicate how, with the abolition of that ownership, these freedoms will be preserved and in particular (*a*) freedom to choose the area of practice and one's medical colleagues, partners, and assistants; (*b*) freedom to allocate duties and responsibilities within a partnership or group; (*c*) freedom to decide when an additional partner or assistant is necessary; (*d*) a say in the choice of a successor?

The answers, point by point, are as follows:

(*a*) Every doctor will be free to practise where he chooses, unless it is one of the areas where the Medical Practices Committee decide no more doctors are needed in the service. In all cases except the latter, "consent" will be automatic. Similarly, all will be free to choose colleagues, partners, and assistants unless the area requires no more (as above) or the regulations on the employment of assistants * are contravened. Where more than one doctor wishes to be the partner or assistant in question the Medical Practices Committee will be asked to observe the wishes of the doctors concerned.

(*b*) Partnerships and groups will be entirely free to allocate duties and responsibilities, as now.

(*c*) Doctors will be free to decide when an additional partner or assistant is necessary, subject to the cases where the Medical Practices Committee decide that no additional doctor at all is needed in the area and subject to the conditions about assistants.*

(*d*) A retiring doctor's views as to his successor would be taken into account by the local executive council, but that council must ultimately decide what to advise the Medical Practices Committee about the new practitioner to come to the area.

12. Will the Minister explain why it is necessary to limit the practice of midwifery to practitioners *with special qualifications* under the English Act, whereas no such limitation is thought necessary in the Acts for Scotland and Northern Ireland?

The term "special qualifications" does not mean any special degree or diploma but simply inclusion in a list of general-practitioner obstetricians compiled locally by a professional body, in accordance with the recommendation of a committee on maternal care established by agreement with the Negotiating Committee. General-practitioner obstetricians will undertake, among other duties, to answer midwives' calls for medical aid and will be entitled to special fees.

Circumstances and practice are entirely different in Scotland.

13. Will the Minister give an assurance that practitioners not in the new service will be able to obtain for their patients, as benefits under the service, such consultant and specialist, including diagnostic, help as they may deem to be necessary?

Yes, within the available resources of the scheme.

14. Does the Minister agree that the appointment of members of the medical profession to administrative and other bodies should be in consultation and agreement with the representative bodies of the profession?

This was settled when the Act was a Bill in Parliament in 1946. The Minister has to consult, but constitutionally the decision has then to be his. But naturally, he will want to take those whose names are agreeable to the bodies consulted.

In conclusion the Minister said that the statement he made in the House of Commons on April 7 (see p. 615), together with the assurances now given, represented in the Government's view the most reasonable modification of the scheme which was practicable to enable the service to start, with the other social legislation of the Government, on July 5. It was, of course, their wish—as and when shortcomings were found in the scheme's working—to correct these as soon as possible, and they would do so. The Minister would always want to hear the views of the profession on any aspect of the working of the scheme. But the principal thing now was for a start to be made and experience gained.

The Minister hoped that, in view of the short period remaining, he would now have the immediate help of the profession in any consultations which he had initiated, or might initiate, with them.

* The regulations about assistants require the agreement of the executive council to the employment of an assistant for more than three months. This is on the lines already familiar for the last 36 years.

Disabilities

2. AFTERMATH OF A CAUDA-EQUINA LESION

AFTER a cauda-equina lesion you can make little progress towards walking until the paralysed bladder and bowels are to some degree controlled. To me bladder control was perhaps the easier; for, though the bladder's subsequent functioning was much enfeebled, it nevertheless returned spontaneously; but to control it adequately was a much more subtle conquest than that of the bowels. First, urination was especially difficult in bed, and from a sitting position almost impossible. Lying on either side—the left for preference—I could usually produce a specimen if both bladder and bowels were full, though inward pressure from my stomach muscles had to supplement the reflex. But on the day of a bowel movement I could urinate only enough to satisfy the initial reflex, being left with probably 12 or 14 oz. of urine in the bladder. This unsatisfactory condition I partly relieved by again stimulating the reflex: scratching softly between the thighs, and on the glans or scrotum;

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but though this helped, there was and is on those days always a slight residue. During the two to four days after a bowel action, however, until the next one, to empty the bladder is easy. But new problems arise when you wish to travel.

For the first six months after leaving hospital, while the bladder reflex was distressingly urgent, I wore a rubber urinal continuously during the day, and in bed slept with a "bottle" between my thighs. Confidence came while I stayed with friends, for there it was not always convenient to change the urinal, so I began in the house to leave it off; and though miscalculating once or twice I was surprised at the amount of control I had. Occasionally, I walked in the streets without it, but with very little confidence, and three years passed before I could dispense with it altogether.

I found it important when choosing a rubber urinal to get one exactly the right size; if too big it is useless, and if too small, especially if the rubber is hard, it can, while you are jolting in a car, for example, cramp and congest the penis and cause urethral bleeding. But this misfortune is I think exceptional, and if you use a properly fitted urinal and make sure that the rubber is pliant it should never happen.

Another disadvantage of a urinal is that it tends to become a spurious necessity, and to sap confidence, so perhaps one should discipline oneself to wearing one as rarely as possible.

Like most men who have had a spinal injury I feared at first that I should be impotent, but was glad to find this was not so.

URINARY ANTISEPTICS

Even after I left hospital my urine was still heavily infected and offensive. My panel doctor gave me potassium citrate but the condition did not improve. Some nine months afterwards I attended a hospital in another part of the country, and various types of urinary antiseptic were tried without much success. Finally, calcium mandelate (in the form of 'Mandecal') proved relatively successful, and all organisms except, I am told, *Ps. pyocyanea* disappeared from the urine, which became clear and lost its offensive smell; and with this improvement came a more certain bladder control. I still take this preparation, reinforced with ammonium chloride taken in gelatin capsules. So long as the urine is thoroughly acid (I test it with methyl-red) it remains clear; but if I leave off the calcium mandelate even for a few days it becomes cloudy, and I develop bladder irritation with a constant desire to urinate. After some experiment I have found that the following dosage scheme keeps the urine acid: one dessertspoon of mandecal three times a day, with eight capsules of ammonium chloride, for two days. On the third day I have only one spoonful of mandecal and one capsule; and on the fourth the same but with four capsules. Then I begin the cycle again. This system, I find, prevents indigestion.

BOWEL CONTROL

My bowels were incontinent and constipated for seven or eight months, purgatives and enemas failing completely, but as soon as I could use a commode the trouble ceased. At first I had to combine the use of this with washouts, but these were discontinued after a week in favour of an emulsion of liquid paraffin with phenolphthalein and agar, which I have used ever since.

At first three people helped me to get from the bed to the commode, but within a fortnight I managed with one person, and within three weeks managed alone. Incidentally, this was my first step towards walking.

Early bowel movements were irregular, from four to eight days apart, for only a small amount of peristalsis returned; but with the liquid paraffin emulsion I got better control. For example, if the bowels had not moved by the third evening, I would take a dessertspoonful and often this would move the bowels once every three or four days for the next fortnight, or even month. If, however, the bowels did not respond to the dose, I took a dessertspoonful morning and night until they did. To supplement this treatment I ate as much fruit, tomatoes, and vegetables as possible. The bowel movements seem, even now over three years later, to run in cycles, usually once every three or four days, but occasionally once every other day, and for periods of less than a week once a day. I have had diarrhœa only once since the incontinent days, and that after drinking iced water.

Progress in controlling both bowels and bladder has for me been fairly constant, though after the initial stage almost imperceptible; I think advance lately has been due rather to better management than to increased control.

WALKING

Even if you have thought you would never walk again, the first steps after twelve months or so in bed are discouraging. Flanked by a nurse at either side, dizzy, feeling that at any moment my ankles would crack, I was hoisted for about twelve feet and then left, sweating and exhausted, to recover from my first afternoon's work. I had discovered, to my surprise, that I could neither balance nor support my body's weight on my legs. But by the end of a week, with two sticks, I could stand alone, and, with only one person to help, could walk 12 feet. Two months later I could manage 50 feet alone, with someone near me in case of accident. Supported very shakily by my two sticks I walked perhaps a third of a step at a time, resting slightly every few steps and for about 5 minutes at the half-way mark. I had massage and faradism regularly, and the use of a walking-machine enabled me to imagine normal walking speed, which I had completely forgotten.

Then one day, tiring of this tedious snail's pace, I walked from the ward to the massage department, a distance of about 250 yards, in roughly 40 minutes. Three or four days later, walking a little faster, perhaps now almost three-quarters of a step at a time, I walked over a mile across ordinary rough ground, crossing a main road and climbing a short hill. I stopped for an hour after half a mile, but even then the journey took me about six hours, and that was my last progress for months. Four or five months after my first steps I went home and there walked twice weekly to a nearby hospital for massage, but by the time I returned to London, after six months at home, despite the two sticks my stride was almost normal, though frequent rests were necessary.

As with former progress, my next step forward was made almost accidentally. In hospital and during my first months at home, even when I could walk a mile or so, I could not move either foot from the ground without my sticks. Then one day I accidentally found myself with only one stick, and taking it in my left hand I managed precariously and very slowly to cross a carpeted floor. With the stick in the right hand, however, I was still unable to move. Several months elapsed before I became tolerably proficient with one stick, and a further two and a half years before I could dispense altogether with the other. In fact I am still unsteady on rough surfaces and cannot mount railless steps at all; nor can I walk as far as I could with the two. Also I still find that long rests with my feet up are essential, whether I walk far or not. Recently, I have been able to move slowly round the house with my right-hand stick alone. The advantage of using only one stick is plainly psychological as well as physical; for not only can you mount buses and trains more easily, and become independent over the carrying of parcels, but you feel

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altogether more normal and far less likely to be pitied. When I walk distances of about a mile I have to be careful of my socks, for blisters, which soon ulcerate, start quickly and heal slowly. Of these I have had only three, all successfully treated with a sulphonamide powder and rest. Of bedsores I have had none since my hospital days, and the two I then had have never broken down.

My right foot being useless, though only partially "dropped," I left hospital wearing a knee-length calliper; but this was extremely heavy so I soon rejected it. I have worn for the last two and a half years a pair of stout-soled suède slippers, an inch-wide strap securing the right one. This method, I think, has been fairly satisfactory; but, since my right foot wobbles and hangs a little lower than is convenient, I would like to use a very light calliper—but I have never seen one. I did try a toe-spring once, but it pulled too much on my leg, which bruises easily, and might have started a sore. I am sure that many people who use such appliances have the same trouble, and we should be pleased if manufacturers could make their instruments as light as possible. Finally, there is the matter of appearance, for the psychological effect of graceless callipers and other visible appliances can hardly be good therapy for the user, who naturally is hoping to look as inconspicuous as possible.

ROOT PAINS

Root pains, it seems, cannot be cured; the only thing to be done is to make up one's mind that they shall not spoil life, and then to ignore them as far as possible.

Public Health

Local-authority Areas and Functions

THE Local Government Boundary Commission, established two years ago with Sir Malcolm Trustram Eve as chairman, has now issued its second annual report.[1] After two years' energetic work, including 600 conferences with local authorities, the commission, whose task is to secure "effective and convenient units of local government administration," has so far made no single order altering the status or boundaries of any local authority. The reasons for this apparent inertia are given in one brief quotation from the present Minister of Health: "Everyone who knows about local government feels that it is nonsense to talk about functions and boundaries separately. They have to be taken together." The commission's jurisdiction extends only to boundaries.

The report therefore reviews local-government functions in their bearing on areas. Weaknesses in the present system arise from disparities in size and resources; from conurbations (particularly in the Black Country, Manchester, Merseyside, Tyneside, the West Riding, and London); from the new system of central control, which involves submission of schemes to central government departments; from the haphazard allocation of functions; and from local conflicts over boundaries. There is, however, general agreement that in the future, as in the past, both two-tier local government (as in counties) and one-tier (as in county boroughs) will continue to be necessary, the appropriate type depending on local circumstances. The general aim should be to make administration as local as is compatible with securing effective services. In theory, different services —highways, education, poor-law, &c.—could be effectively served by different units of administration, but no-one today advocates a return to this 19th-century practice. Another factor is the size of the occupational group—teachers, police, midwives, &c.—to be employed. Too small a group does not attract officers or administrators of the right calibre.

The commissioners then analyse the present position with regard to local-government units. The increase in the complexity, variety, and scope of functions has made the present division of boroughs into "all-purpose" and "minor-purpose" obsolete. A new class, embracing the middle-size towns, of "most-purpose" authorities, has become necessary. Rather than see county-council administration further whittled away, four of the five commissioners would regard the reduction to non-county-borough status of almost three-quarters of the existing county boroughs as the lesser of two evils. They therefore recommend a redivision of all major local-government units in England and Wales into new counties; of these, the bulk would be formed by the existing counties and the remainder by the large cities and towns, with boundaries suitably adjusted. The counties made up of the large cities and towns would continue to enjoy a one-tier system of government and would have populations of 200,000–500,000. The new counties of the present pattern would have populations of 200,000–1,000,000, and a two-tier system. The second tier, consisting of non-county boroughs and urban and rural districts, would be of equal status and have identical functions, both by statutory right and by delegation from the county councils, as "county districts." But within the two-tier counties would also be included a new type of county borough—the "most-purpose" authority —consisting of the middle-size towns and largest non-county boroughs, of 60,000–200,000 population. These new county boroughs would look to the county for certain services (including police and fire) but would be autonomous for services such as health, education, the care of the aged, and some aspects of town-planning. For special geographical reasons, Liverpool and Manchester could best become county boroughs of this new type, and the centres of new counties. Birmingham would be a new one-tier county. In England 67 new counties are recommended, of which 47 would have two-tier government and the remaining 20 one-tier. The new county boroughs would number 63 "most-purpose" units.

The commissioners deal briefly with the problem of Greater London, which, with the exception of Croydon and East and West Ham as provisional new county boroughs, is excluded from their recommendations. In this area live 9 million people, of whom $3^1/_2$ million are in the administrative county. They recall the statement of Mr. Bevan in dissolving the Reading Committee, that "the problem which the committee was asked to undertake cannot satisfactorily be divorced from that of Greater London," and they ask for directions on the principles on which they should proceed in this area.

Only a few of the detailed changes suggested by the commissioners can be indicated here.

Lancashire, which at present has 1 administrative county council and 17 county-borough councils, is, with Westmorland and parts of Cheshire, to form 5 new counties, all the existing county boroughs (except perhaps Bury) becoming new "most-purpose" county boroughs. Yorkshire, with 3 administrative counties and 13 county boroughs, together with the north bank of the Tees, would make 8 counties, 4 of them (Bradford, Leeds, Hull, and Sheffield) of the one-tier type. Staffordshire, with its 7 county boroughs, would form 3 new counties (these areas, with Cheshire, contain 41 out of the present 80 county boroughs in England, and have a population of 11 million). Certain counties on the other hand require union to form suitable units; Hereford and Worcester, and Leicester and Rutland may be instanced.

So far as Wales, with a population like that of Lancashire and a rateable value like that of Essex, is concerned, no definite proposals are yet made, but certain alternatives are outlined and examined briefly.

No major adjustment of local-government boundaries has taken place for sixty years. Since 1944 the functions of local government have been completely recast. Education, health, town and country planning, police, fire, transport, electricity, gas, water-supply, and the care of children have all been or are the subject of major legislation, with the effects of which local authorities are now coping. These developments have produced disturbance; the setting up of the commission has itself added to the unrest; and early acceptance or otherwise of the principles discussed is of importance. Immediate legislation is not essential, but a decision on it is, and would enable the commissioners to continue with the immense volume of preliminary work. Above all, if regrouping is ever to take place it should be attempted now.

1. Report of the Local Government Boundary Commission for the Year 1947. H.M. Stationery Office. Pp. 62. 1s.

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This report is of great importance and will receive wide discussion. The case for functions and units of administration being considered together seems inescapable. It has been too long shelved by legislators of all parties.

Poliomyelitis

The number of notifications (uncorrected) in England and Wales during the week ended April 3 was poliomyelitis 15 (17) and polioencephalitis 4 (1); figures for the previous week are given in parentheses.

It is of some interest to compare experience of the beginning of this year with that of the beginning of 1939, for 1938 was the year of highest incidence before 1947. The total number of notifications in the 13 weeks ended April 1, 1939, was poliomyelitis 116 and polioencephalitis 21. The total number in the 13 weeks ended March 27, 1948, was poliomyelitis 425 and polioencephalitis 21. The figures for 1939 were higher than is usual in the first quarter, and the chief medical officer of the Ministry of Health pointed out[1] that a similar phenomenon was observed in 1927 following the high prevalence in 1926. In 1926–27 it was ascribed to the abnormally mild weather in the last two months of 1926, but in the winter of 1938–39 there was a very cold spell about Christmas followed by a very wet and cold January.

The incidence of poliomyelitis in the early part of a year seems to be an inconsistent guide to the probable incidence during the year. The following are some examples:

Year	Notifications (poliomyelitis only) First quarter	Whole year
1925	72	371
1926	55	1159
1938	71	1489
1939	116	744
1944*	58	464
1945*	52	784
1946*	83	606
1947	102*	7350†

* Corrected figures.
† Estimated corrected figure.

Measles

The recent rise in notifications in England and Wales has been disproportionate and somewhat out of rhythm. Although not explaining this trend, the pattern of measles in the country makes the rise more easily understood.

Since general notification began in 1940 there have been four biennial periods, in each of which the main epidemic peak came in the early months of the second year, following a gradual rise during the whole of the first year. During each of the first three biennia the last three months of the second year were periods of subepidemic level.

At the present moment (the early part of the first year of the fifth biennial period) figures are exceptionally high, and the rate of increase is more rapid than at the corresponding period in previous "even" years. The main difference from previous periods seems to be the absence of the expected quiescent period in the last months of 1947. A rise in incidence followed immediately upon the subsidence of the main 1947 epidemic, and a comparatively high level had already been attained by the beginning of 1948. Present levels of incidence are greatly in excess of those at the corresponding time in 1946 in all parts of the country, the proportionate increase being greater in some districts than in others.

There are two possibilities:

1. That the present incidence is the beginning of a two-year cycle similar to the previous four and leading to an unprecedented maximum at the beginning of 1949. Against this are the facts that (*a*) the rate of increase is more rapid than at the same stage in previous epidemics, (*b*) the rise began well before the beginning of the year, and (*c*) some counties have already passed their peak and begun to decline.
2. That present behaviour is unique since notification began, and that we are now approaching a maximum for the whole country in the "even" year.

Forecasting what may now happen is largely guesswork. In 1946–47 certain towns (e.g., London, Sunderland, and Liverpool) began early in 1946 and came to a maximum in the summer of that year, each having a further epidemic in the summer of 1947. England and Wales may possibly follow the lead of these towns, in which case we can expect two maxima in 1948–49, one in the summer of each year. On the other hand, if a sufficiently large part of the country remains on the rhythm of the winter–spring epidemic we may expect the figures for the whole country to show two peaks, one in the summer of 1948 and the other early in 1949.

It seems inevitable that there will be a high incidence this summer, and this may be welcomed as being likely to reduce fatality even further.

1. Annual Report of the Chief Medical Officer of the Ministry of Health. 1938; p. 32.

In England Now

A Running Commentary by Peripatetic Correspondents

My favourite patient dropped in this morning. Six months ago she came to me because she was getting electric shocks all over the body whenever she touched water. For a good while she did pretty well on homœopathic doses of the irritating medium, tinged with gentian violet and flavoured with menthol. She now feels better than she has done for years and is putting on weight, but she still gets little shocks in the fingers when she washes clothes. I advised her to put a lighted candle by the side of the tub, on the principle that the presence of fire should neutralise the evil elements in the water. She went off well satisfied with the idea. We shall see.

* * *

Talking of burns, one very hot morning in July, 1944, when we were in Normandy, a R.E.M.E. private was brought in to see us. He was clearly in much pain, and the cause was not difficult to find, for after removing his trousers we observed that a large circular patch of erythema covered his buttocks. His trousers were not even singed, which at first seemed odd, but when the patient had overcome his modesty he explained how it all happened. In the early hours of the morning he had been forced to make a rapid excursion to the latrines. While comfortably seated, he decided to spend the brief period of solitude in meditation, so he lit a cigarette and discarded the lighted match into the bowels of the earth. Great must have been his consternation when sheets of flame issued forth out of the darkness and played with such extraordinary fury upon the exposed part of his anatomy that he was fairly severely burnt before he could spring up.

We decided to investigate this sad affair, so after lunch we sallied forth in the ambulance to the scene of the crime. The officer commanding the unit sent without delay for the orderly corporal, who told us that the camp was infested with a serious plague of flies, so being a conscientious corporal he had decided that morning to start a blitzkrieg on their hide-outs. Having poured petrol down the latrines with the intention of setting fire to it immediately, he found that he had left his matches behind in his pack. While he was searching for them our unfortunate patient unwittingly, but nevertheless efficiently, produced the required result.

* * *

The monstrous regiment of women has arrived in our medical college, and we have absorbed it with pleasure and without any troubles, other than structural difficulties arising from sep. tab. and baths h. & c.; in fact, they add a splash of colour, both to the laboratories and to the edges of the teacups. Our worst fears are unrealised. As we are well past the third month, without evidence of disaster, all is probably going to be well.

But how will Cambridge take it? Not that they are unused to women—I am thinking of the problem of transferring the New Look to academic dress. They'll sneak out on the textile shortage, you mark my words.

* * *

Recently I was marking a case-history taken by a student and found the following account of the patient's previous illnesses: "Chicken-pox aged 10, measles aged 12, married aged 18, diphtheria aged 21." So at last matrimony has been recognised as pathological.

* * *

I was sorting out my kit after years of campaigning in the Tropics when a clinical photograph of a case of yaws in an African babe dropped from a book. My wife picked it up. "What's this?" she inquired. "It's yaws," I replied. "It certainly is not," she said indignantly.

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Letters to the Editor

ATTACK ON RHEUMATISM

SIR,—The letter by Dr. Savage last week, as well as Dr. Tegner's address and your leading article in the previous number, indicates the need for better instruction and training in the management of chronic rheumatic disease for the medical student; and with this I cordially agree. In the crowded curriculum there is, however, little room, nor is there the incentive, to study diseases which, however important they may be in practice, do not play a large part in the final examinations. There is a field for instruction of greater importance which is not subject to these obstacles and which demands attention—namely, the management of rheumatism in general practice.

Postgraduate courses in teaching hospitals are to a great extent out of the reach of the busy general practitioner, who may live fifty or a hundred miles away. I would suggest that the large provincial non-teaching hospitals might well organise courses, possibly for two days at a weekend. A team of two or three doctors might be arranged for, to attend and give lectures and clinical demonstrations on different aspects of the subject, and cases could be collected by the hospital staff or sent in by doctors from outside for demonstration, consultation, or advice.

It is not unlikely that the Empire Rheumatism Council would be willing to help in the organisation if approached by the local hospital or medical society. It seems to me that there might be great possibilities in such an arrangement, and it would be interesting to hear from other doctors on the subject.

Ashbourne, Derbyshire. CHARLES W. BUCKLEY.

SIR,—I should like to endorse the case for the rheumatic specialist made last week by Dr. Savage.

As one who has only recently become interested in this field, I have been struck rather forcibly with one aspect. There appears to be a widespread impression, both among the lay public and the medical profession, that the specialist in physical medicine and the rheumatic specialist are one and the same; I think I was under this impression myself. There seems to me to be a very important difference. Surely physical medicine is a specialised branch of therapeutics. I am well aware that many departments of physical medicine are in the charge of physicians who have an interest in this branch of therapeutics but who remain physicians. This is by virtue of their qualifications and status, and not by virtue of their specialty. This does not, therefore, affect the main argument that the specialist in physical medicine is not, ipso facto, a rheumatologist.

In a rheumatism department many different disorders are seen; these are often associated with pain—for example, malignant disease. If serious errors through concentration on treatment rather than diagnosis are to be avoided, these cases must be seen by a physician. He need not be a specialist in physical medicine, but he should have a wide experience and training as a rheumatologist.

If the attack on rheumatism is to make real progress—and all agree that little progress has been made towards a true understanding of this group of diseases compared with advances in other branches of medicine—then surely this attack should be in the hands of physicians trained in rheumatology rather than of specialists in one branch of therapeutics which happens to be largely associated with the rheumatic diseases.

Harpenden, Herts. R. M. MASON.

SIR,—It is impossible to over-estimate the importance of the rheumatic diseases in the health of the community, particularly in a country fighting to live. Dr. Savage emphasises the need of a general training and a coöperative mind in all who undertake the treatment of this group of ailments. I should like to add a further point or two.

Training of the student in the rheumatic diseases is neglected; but then the teaching in a university hospital depends on the cases admitted. I agree that a rheumatologist must be trained in general medicine. The diploma in physical medicine is useless, except perhaps as an intangible export. It qualifies the recipient neither to practise medicine as a specialist nor to play with sparks. In this respect I feel that it is high time that the specialists in this field, who above all other things dispense volts and amps, should invite the coöperation of the electrical engineers and physicists in solving the problems of the body's reaction to various rays and waves; this might help to define the action and limitations of electrotherapy.

The rheumatic group of disorders is interesting, but not to the physician who prefers to be able to look up treatment in a book. Ætiology and treatment are still unknown and invite the study of original minds. All too often one meets with the attitude: "arthritis?—there is no treatment, so why bother!"

County Hospital, Farnborough, Kent. DAVID P. NICHOLSON.

MASSIVE TONSILLAR LYMPHATIC ADENITIS

SIR,—For the past nine months a team of health visitors and doctors have been studying all the infective illnesses of 1100 infants born in this city, in order to attempt a more precise understanding of the many clinical patterns of infection in infancy, and the associated infections in other members of the household. We are glad, therefore, that Dr. Gray and Dr. Garson have placed on record their experience with the disease they call massive tonsillar lymphatic adenitis (March 13). Although they suggest that the 21 cases represent a single disease, there was a striking variation in the duration of the swellings: 9 lasted 9 days or less, 7 between 2 and 3 weeks, and 5 from 1 to 3 months.

We are familiar, as others must be, with the large indolent tonsillar or upper-cervical adenitis, not preceded by obvious pharyngitis and with little constitutional upset, which eventually subsides after several weeks. The ætiology of these swellings remains unknown and we have insufficient data to permit speculation. The massive cervical swellings of short duration are equally interesting.

For the past four months we have watched the development of an epidemic in this city which has been generally regarded as mumps. The striking prominence in some cases of undoubted tonsillar lymphadenitis made us initially sceptical of this diagnosis, yet the speed of onset, the absence of pharyngitis, the minimal disturbance of general health, the incubation period of from 14 to 19 days, and the massive character of the swellings and their disappearance within a matter of days suggested that this was an unusual type of lymphadenitis. It was not until the disease affected one of our own families that a possible explanation was found.

Here, 17 days after simultaneous exposure to the prevailing "mumps," a boy of 5 and a girl of 4 developed a febrile illness with some malaise and swellings in the neck. The boy had an undoubted parotitis with inflammation of Stensen's duct and no lymphadenitis; the girl, striking bilateral tonsillar adenitis with no apparent salivary-gland involvement. Careful examination 5 days later revealed some swelling of the cervical part of the right parotid together with inflammation of Stensen's duct. The parotid swelling, however, was insignificant compared with the lymphadenitis and could easily have been overlooked. Again 8 days from the onset, bilateral submaxillary swellings appeared which clinically resembled a lymphadenitis rather than involvement of the salivary glands.

This disease has occurred in 17 of the "investigation" families, and among the children and staff of a day-nursery. In 3 of the affected children upper-cervical lymphadenitis was an important feature of the illness. There seems no reason to doubt the diagnosis of mumps in these cases. We find that several textbooks refer briefly to the fact that cervical adenitis may occur during this disease, though they regard it as minimal and not likely to cause diagnostic difficulty.

From these observations it appears that mumps may cause a striking cervical lymphadenitis, and we wonder whether some of the cases reported by Gray and Garson might be explained in this way. The description they give does not permit us to press this point, but we

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agree with them that there is still room for the careful observation and more detailed description of common disorders in childhood. It is perhaps in this way that the family doctor will again find his place in clinical research.

Department of Child Health,
University of Durham,
Royal Victoria Infirmary,
Newcastle-upon-Tyne.

F. J. W. MILLER
S. D. COURT.

FOR AND AGAINST MYANESIN

SIR,—In your leading article of March 27 I read that "other observers contend that it ['Myanesin'] is ineffective for producing muscular relaxation and that its use is often accompanied by undesirable effects such as hæmolysis and thrombosis." I am not an anæsthetist but a gynæcological surgeon, and as I have operated under myanesin anæsthesia on 65 occasions I would beg leave to comment on this statement.

The first part is a misrepresentation of the facts as I find them. I would say that the relaxation is as good as that obtained with spinal anæsthesia. It differs from spinal anæsthesia in that it takes a few seconds longer to develop and does not last so long; in other words, the dose may have to be supplemented if the operation is prolonged. My second comment is on the word "often." There has been no venous thrombosis in any one of my patients. I do not know what the explanation of this is, but it suggests to me variation in the technique of giving the injection. Intravenous administration is a nice surgical performance, and I am afraid that many anæsthetists just have not got the hands necessary for it; perhaps this has something to do with the thrombosis.

Hæmolysis (if it is hæmolysis)—yes, very occasionally, but none of the patients has been upset by it and I am told that iron has not been detected in the pigment.

British Hospital for Mothers and Babies, London, S.E.18.

KEITH VARTAN.

PERINEPHRIC ABSCESS

SIR,—In your issue of March 20 Major Kronenberger reported a case diagnosed as perinephric abscess treated with penicillin without operation, and he mentioned further cases treated similarly with success. I have heard other claims made of successful conservative treatment of perinephric abscess with penicillin.

It is my opinion that perinephric abscess is a difficult condition to diagnose, and I doubt whether a positive diagnosis can be made except by exploring the perinephric region and demonstrating the abscess. In my experience perinephric abscess is not common in this country, but it seemed to occur more frequently under conditions pertaining during the war, and I had occasion to observe some dozen cases, mostly in other nationals, within a period of about 2 years. In this admittedly small number of cases the essential features of the condition were pyrexia, malaise, and rapid loss of weight, and only later discomfort, rarely amounting to pain, in the affected renal area. Tenderness and rigidity of the loin muscles were present in the later stages, though usually not pronounced; and in no case was a tumour palpable. The white-cell count was high, usually over 20,000 per c.mm., and I think a diagnosis was not made before 2 or 3 weeks after the onset of the illness.

All cases were treated by operation, and in several the perinephric abscess was localised to one part of the kidney surface—either the upper or the lower pole—so it was sometimes necessary to explore the whole perinephric region to find the abscess. In no case was there evidence of associated renal disease and all made a complete recovery.

At the end of this series I saw what appeared to be a truly typical case of perinephric abscess with pyrexia, malaise, loss of weight, and marked tenderness in the left loin with rigidity of the muscles and scoliosis. The patient had been ill for some 3 weeks following a minor skin sepsis, and the white-cell count was over 20,000 per c.mm. I felt certain this was a case of perinephric abscess and at operation freed the entire kidney to find no sign of abscess or other abnormality. The wound was closed, and it healed by first intention; the patient gradually recovered and 6 months later was fit and well. No diagnosis was ever made, no other condition was revealed in spite of full investigation, and the only treatment was rest, although it is possible he had one of the sulphonamide drugs, which appear to be a food rather than a medicine in most hospitals.

The purpose of these remarks is to indicate how fallacious may be these case-reports of perinephric abscess cured with chemotherapy, since claims of cure are made for a condition which cannot with certainty be diagnosed except by surgery. In this particular case-report the features do not conform with those of cases I have seen, though it is clear that the picture of this disease varies widely.

While it is reasonable to suppose that penicillin may cure a perinephric infection in the early stages, often the condition is not then suspected. In the later stages, when diagnosis can be made with more confidence, usually an abscess of some size is present, which surely is better treated by simple surgical drainage than chemotherapy.

Hove.

L. W. LAUSTE.

FOLIC ACID AND THE NERVOUS SYSTEM

SIR,—Some results recently obtained in these laboratories may have a bearing on a point which is discussed in your leading article on March 6.

We have found that the utilisation of glutamic acid by *Lactobacillus casei* and *Streptococcus fæcalis* R was not affected by increasing the folic acid—i.e., pteroylglutamic acid (P.G.A.)—content of the culture medium by one-thousandfold.[1] A similar test has been used successfully in the identification of compounds which serve as antimetabolites for glutamic acid.[2] Antimetabolites of glutamic acid depress the utilisation of glutamic acid by *L. casei* and *L. arabinosus*. These organisms require both glutamic acid and folic acid for growth.

In our studies, the respiration of rat brain slices in vitro was not inhibited by adding P.G.A. to the medium at a level of 3×10^{-4} molar, which corresponds to more than 100 times the highest concentration which has been reported in the bloodstream of human subjects following the intravenous injection of 15 mg. of P.G.A.[3] The increased respiration of rat brain slices produced by adding glutamic acid was not reduced by adding P.G.A. to the medium at concentrations of 3×10^{-3} molar and 3×10^{-4} molar. The respiration-rate of brain slices of P.G.A.-deficient turkeys, with or without added glutamic acid, showed no consistent differences from the rate of brain slices of control birds which had received an adequate dietary supplement of P.G.A. Brain and kidney tissue slices from rats which had received a high dietary level of P.G.A. were found to respire at the same rate as corresponding tissues from control rats, with or without added glutamic acid. In all cases, the addition of glutamic acid was found to increase the rate of tissue respiration. These findings do not support the suggestion that folic acid may block the utilisation of glutamic acid.

The suggestion was recently advanced that one type of megaloblastic anæmia may arise from a dietary deficiency of folic acid, while a second type may be due to a metabolic defect.[4] It would appear that pernicious anæmia may be classed with the second type and that deficiencies of both folic acid and an unidentified factor in liver may be present in this disease. Administration of folic acid may, by alleviating the anæmia, bring the neurological symptoms into greater prominence; for if all forms of therapy were withheld the progress of the anæmia would cause a more generalised deterioration of the patient. These explanations, however, fail to account for the improvements in neurological signs and symptoms which have been observed in certain pernicious-anæmia patients who were treated with folic acid alone.[5] In the series lately recorded by Davidson and Girdwood,[6] one patient apparently required both folic acid and liver extract.

Lederle Laboratories Division,
American Cyanamid Company,
Pearl River, New York.

THOMAS H. JUKES.

1. Franklin, A. L., Regan, M., Lewis, D., Stokstad, E. L. R., Jukes, T. H. (in the press).
2. Waelsch, H., Orvades, P., Muller, H. K., Borek, E. *J. biol. Chem.* 1947, **166**, 273.
3. Denko, C. W. Abstracts of Papers, American Chemical Society, 112th meeting. New York, 1947; 25c.
4. Jukes, T. H., Stokstad, E. L. R. *Physiol. Rev.* 1948, **28**, 51.
5. Doan, C. A., Wilson, H. E., Wright, C.-S. *Ohio St. med. J.* 1946, **42**, 139. Hall, B. E., Watkins, C. H. *J. Lab. clin. Med.* 1947, **32**, 622. Bethell, F. H., Sturgis, C. C. *Blood*, 1948, **3**, 57.
6. Davidson, L. S. P., Girdwood, R. H. *Lancet*, March 6, p. 360.

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MEDICAL LIBRARIES

SIR,—I should like whole-heartedly to support Mr. Bedwell's plea, in your issue of April 3, for whole-time trained staff in medical libraries. There has in the past been some excuse for medical librarians not to study for the Library Association examinations, in that these were very largely concerned with public-library practice. This state of affairs will shortly be greatly improved. The whole educational syllabus of the Library Association is now being drastically revised, and provision will be made in future for the needs of special librarians. Care will be taken at all three stages (entrance, registration, and final) to correct the former public-library bias; and in the final examination one of the alternatives in part 4 is to be medical librarianship, the syllabus for which has been compiled by the committee of the new medical subsection.

CYRIL C. BARNARD
Chairman, medical subsection of the university and research section, and member of the education committee, Library Association.
London School of Hygiene and Tropical Medicine, W.C.1.

ELECTRONARCOSIS

SIR,—We are in substantial agreement with Dr. Paterson and Dr. Davies (April 3) in their observations on the technicalities of electronarcosis. In other respects, however, much of their letter seems to us unacceptable. We cannot, for example, follow the reasoning beneath the statement that "there were already grounds for believing that electronarcosis would be more effective." During insulin coma a wide range of autonomic activity is seen and pallor is even more common than flushing. Loss of consciousness is common to insulin shock, electronarcosis, and chemical narcosis; and there the resemblance seems to stop. Both clinically and physiologically the relationship of electronarcosis to electroconvulsive therapy (E.C.T.) is close. We have made a considerable number of careful observations of cardiovascular, respiratory, and blood changes and found them substantially the same as those described in E.C.T. by Accornero,[1] Friedman and Barry,[2] and many others. As they show nothing that is new we have not published them. The difference from similar observations made during hypoglycæmic coma is, of course, profound.

It is perhaps unnecessary to stress that the results of animal experiments and of psychometric testing must be interpreted with care. The latter is still a very coarse index, both of personality change and of dementia; and the former is hardly likely to reveal evidence of brain dysfunction, which may nevertheless be both considerable and irreversible. We cannot feel lighthearted about organic clouding of consciousness, especially when it is sustained; and we find the statement (reproduced in the ensuing letter by Dr. Milligan) that such traumatic clouding is therapeutically valuable to be one which fills us with something akin to horror. The work of Romano and Engel[3] is of great interest in this connexion, and we would respectfully commend it to the attention of our critics. Oddly enough, the desirability of observing blood-pressure and pulse-rate during the treatment had already occurred to us, as we have found these precautions useful in other physical treatments for some years. We did not find, however, that sudden and harrowing peripheral circulatory collapse could be prevented in this way; nor, we suggest, is it likely on physiological grounds that it could be.

We may reasonably be chided for treating our cases with such heroism that we caused an unduly large number of them to collapse, or alternatively that we were so beset by timidity that we failed to produce results. While inclining to the former possibility ourselves, we are bound to observe that Dr. Paterson and Dr. Davies cannot have it both ways. We readily admit the smallness of our series, but as noted in the original paper we felt that the uniformity of our results did not allow us to continue with a treatment that we believed to be useless when we had in insulin a therapy which is known to be effective in a reasonable proportion of cases. We therefore submitted our belief that electronarcosis has not established any title as a therapeutic agent in the treatment of schizophrenia. We would, however, disclaim the tendency to dogmatism which has occasioned Dr. Milligan's surprise, and readily admit the question still to be open. We await with interest the experience of others in this field.

GERALD GARMANY
Bristol. DONAL F. EARLY.

1. Accornero, F. *Riv. sper. Freniat.* 1940, **64**, 459.
2. Friedman, E., Barry, H. *J. nerv. ment. Dis.* 1941, **94**, 688.
3. Romano, J., Engel, G. L. *Arch. Neurol. Psychiat.* 1944 **51**, 356.

MARRIAGE GUIDANCE COUNCIL

SIR,—The National Marriage Guidance Council relies largely on the help and advice of the medical profession in its efforts to educate the public in preparation for marriage as well as in the important work of reconciliation in the cases of broken homes and marriages. The interest of practitioners and specialists, who can subscribe to the principles upon which the council bases its work, is now solicited even more urgently. Local B.M.A. groups, at one of their meetings, perhaps would be willing to accept the services of a speaker on the medical aspects of marriage guidance, and a discussion helpful to both sides might be arranged.

Talks by medical representatives will be gladly arranged if requests are sent to the secretary of the medical committee, Marriage Guidance Council, 79, Dyke Street, London, W.1.

NOEL HARRIS, Chairman of medical committee.
ETHEL DUKES, Secretary of medical committee.

THE DOCTOR'S WIFE

SIR,—I was interested to see panel practice described as "irritating." There is no doubt that club certificates and the like can be very irksome, but the present N.H.I. scheme is after all only a phase in the development of a true public health service. I personally find its advantages very much greater than its disadvantages: I like to be able to order treatment without reference to the patient's ability to pay for it; I like the freedom to visit him as and when I see fit without involving him financially in any way, and I enjoy meeting my patients on such a footing.

It seems a little ungenerous to cavil at the waste of time and effort over certificates without acknowledging that rather more time and effort is saved by not having to send out bills. A secretary in a general practice is the exception rather than the rule; it is either the doctor or his wife or both who must tackle the job; and (as you say) she should welcome the prospect of a service which offers a livelihood without the necessity of extracting it piecemeal from the people whom the doctor is so anxious to help and befriend.

I do not find that my panel patients abuse their claim on my time and attention, and I believe that most patients would be disinclined to do so, except in fear. The insured patient may well set out with the fear that—other things being equal—the paying patient is somehow entitled to more particular attention from his doctor than himself. It is of course for the doctor to disabuse him of any such idea. After twelve years in a mixed practice, I would say that while a night call from a private patient is generally urgent, one from a panel or public-assistance patient always is. This is very encouraging, since it shows a sense of responsibility in the patient towards the success of a public service; he is quite aware that important matters can only receive adequate attention if unimportant ones receive little or none, and although his judgment may be faulty, he will coöperate in putting first things first.

Very much the same applies to the trivialities which flood the surgeries. Certificates apart (and it is difficult to see any alternative to them in procuring sickness benefit), what constitutes the bulk of these "trivialities"? Perhaps one might define them as matters which seem unimportant to the doctor but not to the patient. Obviously the doctor knows better, but the patient can be made to know better too, if a little time and trouble is taken to educate him. It sounds a vast and tedious programme; in practice it boils down to "weaning him of the bottle"—unless the doctor himself believes that the bottle is necessary. The less the discrepancy between their respective views in the

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matter, the fewer the "trivialities" will become. As long as the patient's faith in and dependence on the bottle remains, it is unreasonable to expect him not to ask for it; it is reasonable to expect the doctor to enlighten him, and make him independent of meaningless medication. It is a form of social medicine, it is re-education in the true sense of the word, and, in the long run, it is the surest way of keeping surgeries empty.

PRACTITIONER.

PAMPHLET ON AMPHETAMINE

Messrs. Menley and James Ltd. write:

Our attention has been drawn to the leaflet published by us entitled "A Symposium on the Uses of 'Benzedrine.'" This contained abstracts of or extracts from papers read at a meeting of the Society for the Study of Addiction, by Dr. Crichton Miller, Prof. R. C. Browne, and Dr. G. de M. Rudolf, amongst others, dealing with the effects of amphetamine. It is represented to us that this pamphlet is so worded as to give the impression that these gentlemen were advocating the use of benzedrine tablets, a proprietary preparation of amphetamine sulphate manufactured and distributed by our firm. We regret very much if the pamphlet was so worded as to give this impression, and desire to make it clear that the gentlemen in question were not consulted and had no part in the preparation and publication of this pamphlet.

Parliament

FROM THE PRESS GALLERY

A Clarifying Bill

IN the House of Commons on April 7, Mr. ANEURIN BEVAN, Minister of Health, made the following statement:

I think that the time has come for me to make a statement to the House about the medical profession and the National Health Service. Needless to say, I make this statement on behalf both of the Secretary of State for Scotland and myself, and of the Government as a whole.

I have been receiving representations from many quarters and I have studied the resolutions which both the Royal College of Physicians and the British Medical Association have sent on to me—and which have since been published and are familiar to the House. Meanwhile I have been trying, so far as I am able, also to determine for myself what it is that is really and sincerely worrying the doctor.

No doubt, as we gain experience, we shall find many modifications which would improve the scheme. That is always true of major legislation of this kind. But it seems to me that it is somewhere beyond all this that the key to the doctors' unease and restlessness lies, and that it consists of some instinctive fear—shared by many most well-meaning men and women—that, although the Act does not propose it and although the Government have themselves denied it, the real objective is a full-time, salaried, State medical service. It is this fundamental point which I want now to tackle once and for all. As long ago as 1946, in this House, I said:

> "Some doctors have expressed the fear that this is merely the beginning of a full-time salaried service. I cannot read into the mind of any future Minister or prophesy what may be done by future Governments, but that is not our intention."

But it seems clear that something more than my spoken assurance is needed, and I am certainly quite willing to do anything to banish this apprehension for good. The Royal College of Physicians has made the useful suggestion, with which the other Royal Colleges associate themselves, that I should now make it statutorily clear that a whole-time service will not be brought in by regulation, but would require further legislation to make it possible. My colleagues and I accept that, most cordially. In short, we propose that it should be clearly impossible to institute a full-time salaried service by regulation alone. It would then need express legislation if it were ever proposed.

As the House knows, I am about to set up an expert legal committee to advise me on the disputed effect of the Act on partnership agreements. It seems likely that a short clarifying Bill may be needed as a result of its inquiries. If so, I shall take the opportunity—and, if not, I shall invoke an opportunity specially—to ask Parliament also to clarify our intentions about any full-time salaried service, in the way suggested above.

There is one further way, I think, in which we can eliminate these apparently widespread fears of a full-time salaried service. By many doctors the proposed fixed element of £300 in remuneration seems itself to be a menacing thing to freedom. I for my part have always conceived it rather as an assurance for the young beginner and for the older practitioner wishing to ease up in old age, and as a peg on which to hang additional assured payments for doubtful areas or other risks—and these are all worthy objects. However, if doctors are afraid of sinister intentions in this, I think these worthy objects can be achieved in another way, and no amendment of the Act is needed for this. Let all new entrants to practice have the advantage of this assured element of £300 for a period of, say, three years. Then let each decide for himself whether he will forgo it and pass to a system of plain capitation fees, or stay as he is with his fixed £300 plus a lower proportionate rate of capitation. He will be able to do this at any time. Similarly, let any doctor in established practice be able to elect for himself at any time to go on to the system of £300 fixed payment, plus the lower capitation rate, if and when he wants to—for example, in old age—instead of the higher rate with no fixed payment at all.

So now it can rest with the individual doctor himself to decide the extent to which he prefers the combined system of £300 plus lower capitation, or all capitation—with the exception that beginners will start with three years on the former system.

One other point. I have already given assurances in this House that I do not for one moment intend to interfere with the ordinary rights of doctors to express themselves in speech or in writing with absolute freedom. Similarly I have already given assurances to the profession that the chairman of the tribunal under the Act will be a lawyer of high professional standing appointed by the Lord Chancellor. I need scarcely repeat such assurances now, but—for the removal of any vestige of doubt—I do so.

I trust that what I have said will finally free doctors from any fears that they are to be turned in some way into "salaried civil servants." I look forward now to a future of active and friendly coöperation with the profession in putting into operation next July a great social measure, which can be made a turning point in the social history of this country and an example to the world.

Mr. OLIVER STANLEY: All of us in this House hope that when this National Health Service scheme comes into force it shall come in a form which will command the whole-hearted coöperation of the doctors. It always has been, and it still is, for them to decide . . . but on this side of the House, we welcome anything which tends to break the deadlock which has occurred, and above all we welcome the tone in which the Minister has spoken today.

Mr. CLEMENT DAVIES: May I, on behalf of my colleagues, congratulate the Minister upon the action which he has taken and the statement he has made. I am quite sure it is the desire of every one of us that the National Health Service should work smoothly and harmoniously. I should like to ask him whether he is prepared—as I am sure he is—to meet the Negotiating Committee at once if they desire to see him.—Mr. BEVAN: As I have said on many previous occasions, and as the Prime Minister declared quite recently, I am always prepared to meet the Negotiating Committee when they desire to see me.

Dr. HADEN GUEST: May I also congratulate the Minister on this decision, largely on the ground that it will secure that the service will begin with the good feeling of the doctors and the good feeling of the whole country in this matter—a most important aspect of this new service?

Mr. WILSON HARRIS: Will the Minister clarify his encouraging statement in two respects? First, will he give an assurance that no influence will be brought to bear on the doctors in the matter of issuing sickness certificates? Secondly, with regard to the basic salary, the formal suggestion of the Royal College of Physicians

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seems to leave it open to any Minister to raise the £300 by regulation to £600, £900, or any figures so long as it does not constitute a whole-time salaried medical service. Would the Minister be willing to go as far as to put into the amending Bill a provision that the original sum of £300 should not be increased except by a new Act of Parliament?—Mr. BEVAN: That is a point of refinement which can be looked into later on. I am perfectly prepared to discuss the terms of the amendment with the representatives of the medical profession. I should like to take this opportunity of pointing out that there is considerable misapprehension on this matter. People appear to think that the power to make terms and conditions of employment by regulation is something the Minister himself wants. The fact is that it is usually what the professions themselves desire, because it makes the whole system much more flexible. If we had to have an amending Act every time we altered the terms and conditions of remuneration, very often they would not be altered. The recent increase in capitation would not have been possible except by regulation.

Sir ERNEST GRAHAM-LITTLE: Will the Minister take into consideration the second motion which was moved at the meeting of the Royal College of Physicians, and accepted by them?—Mr. BEVAN: I am always prepared to receive any representations made to me either by the Negotiating Committee or by the Royal Colleges.

Mr. JOHN BAIRD: As the Minister today has been very generous to the British Medical Association, will he take into consideration the disquiet felt by Members on this side of the House about the delay in setting up health centres, and will he also consider making a gesture to this side of the House by speeding up the building of health centres?—Mr. BEVAN: That lies rather outside the scope of the statement I have made, which is concerned with the terms and conditions of remuneration of the general practitioners. I hope, however, that the statement I have made will elicit from the representatives of the doctors the same spirit of cordial coöperation.

Miss ALICE BACON: Is the Minister aware that any further concessions made by him will not be welcomed by many of us on this side of the House?—Mr. BEVAN: It will be the opinion of Members in all parts of the House and of the general public that the Government have gone a considerable way to meet the profession, and it now lies with the profession to show an equal desire to make the National Health Service a success.

Mr. JOHN RANKIN: If at the end of three years a doctor decides to continue receiving the £300 basic salary, will he have to accept the lower capitation fee?—Mr. BEVAN: Most certainly. He cannot have the £300 basic salary plus the higher capitation rate. He must take one or the other. The advantage of the proposal that I made is that the extent to which a fixed element is in existence will depend upon the initiative of the doctors themselves, and upon no-one else.

Dr. S. SEGAL: In view of the cordial reception given from all parts of the House to the Minister's statement, will he now himself take the initiative in inviting the Negotiating Committee to meet with him to discuss their remaining fears about the National Health Service?—Hon. MEMBERS: No.—Mr. BEVAN: Members in all parts of the House will realise that the prestige of Parliament must be sustained. I am always ready to meet representatives of the medical profession. I should like to point out that we have sent to them in the course of the last few months a considerable number of letters asking for their coöperation on technical matters, and we have not received that coöperation.

Viscount ADDISON made a similar statement in the House of Lords which was welcomed by the Marquess of SALISBURY, Viscount SAMUEL, and Lord MORAN, who added:

This Health Act, it has been said, is feared far less for what it is than for what it may become. Doctors have dreaded that the Act may be the prelude to a whole-time medical service. The Minister, by promising an amendment of the Act, has done all that is possible to remove that dread. He has done more. He has fully met the representations which some of us have made to him, by making the basic salary optional after three years in practice. The Minister has boldly met the main fears of the doctors. I hope he will be rewarded by the loyal support of all reasonable members of my profession, and that we shall now set our minds to the task of making this service, under very difficult circumstances, in the Minister's own words "a turning point in the social history of our country."

National Assistance Bill

Speaking in the House of Lords on April 6 in the debate on the second reading of this Bill (which has already passed through the House of Commons [1]), Lord AMULREE warmly welcomed the measure and foresaw that fine work would be done under it. But there were one or two good principles of the old poor-law which he did not see mentioned in this Bill, though no doubt they were there if one could only find them. He brought them forward only to be reassured that the Government would not lose sight of them. One of the great things about the old poor-law was that people who were destitute had the right of admittance into a public-assistance institution, even though it might not be a good one. That principle was rather shaken by the passing of the Local Government Act of 1929, when some of the public-assistance infirmaries were transferred from public assistance to public health. There had been a tendency then to make them too good and to turn them into general hospitals rather than places where destitute people could be taken.

His second point, Lord Amulree continued, was the round-the-clock service offered by the old public assistance. Catastrophes were apt to occur out of office hours, during the night and the weekend. The 24-hour service had been possible because under the poor-law there were a large number of medical relief districts possessing a relieving officer with a staff. There were, Lord Amulree thought, 1500 of these relief districts in England and Wales, employing about 4000 people. Under the present proposals the Assistance Board would try to run the same service with 300 officers and it looked as if the 24-hour system would be more difficult to maintain. Again the poor-law areas were served by district medical officers, who were paid on a part-time basis, but who were on call for 24 hours. At present, on the ground that they were part-time officers, it was not proposed to compensate these doctors, but Lord Amulree thought the point might be well raised on the Committee stage.

Turning to the special problems of the aged, Lord Amulree pointed out that at present there were homes and hostels run in conjunction with hospitals. Old people after they had been treated in hospital could readily be moved to an associated home, and hospital beds saved for serious cases. Lord Amulree feared that when the hospitals were taken over by the regional boards and the hostels by the local authorities, there might be an administrative barrier to the easy transfer of patients from one to the other. He suggested that a committee should be set up as a link between the board, who would be caring for the chronic and aged sick, and the local authorities, who would be taking care of the healthy people.

Lord Amulree believed it was proposed to establish homes for 20,000 or 25,000 old people, but the Nuffield report estimated that the number of people in the 60–65 age-group would increase by more than 300,000 between 1949 and 1954. Voluntary homes had, he thought, a certain advantage over local-authority, for anything run officially was bound to become a little standardised. We needed a wide variety of homes so that people could be grouped under their own cultural heading. Again the voluntary body had scope, not for extravagance but for extra comfort.

Lord CHORLEY, replying for the Government, said every destitute sick person would be provided for under the National Health Service. It had never been a fact that there was a complete 24-hour service statutorily laid down. He did not think that Lord Amulree need fear that there would be any difficulty at all in dealing with urgent cases.

1. See *Lancet*, 1947, ii, 850.

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Control of Radioactive Substances

By the Radioactive Substances Bill, introduced last week in the House of Lords, the Government seek powers to protect the health of those working with radioactive matter and to prevent its misuse in the diagnosis and treatment of human disorders. Under the Bill, which applies to the whole of Great Britain and Northern Ireland, the Minister of Supply has authority to deal in radioactive substances. Only doctors or dentists licensed by the Minister of Health or the corresponding Minister in Scotland or Northern Ireland may obtain and use certain radioactive substances; and irradiating apparatus is to be subject to similar control. The Bill provides for regulations to protect from injury employees in hospitals and other establishments not already covered by legislation, and to secure proper disposal of waste products. An advisory committee is to be appointed to assist the Ministers concerned in the operation of this measure.

QUESTION TIME

Legal Committee on Partnerships

In reply to a question, Mr. ANEURIN BEVAN stated the following had been appointed to this committee: Mr. G. O. Slade, K.C. (chairman), Mr. Colin Pearson, Sir Cyril Radcliffe, K.C., Mr. J. H. Stamp, and, from the Scottish Bar, Mr. J. R. Philip, K.C. The terms of reference are as follows:

To consider whether, in the application of the principles set out below to partnerships existing at the appointed day, it is desirable, in order to secure an equitable result as between partners, to amend sections 35 and 36 of the National Health Service Act, 1946, either by clarification of the provisions thereof or by the extension of the powers thereby conferred or in some other way, and to make recommendations accordingly.

The principles above referred to are:

The general prohibition of the sale or purchase of the goodwill or any part of the goodwill of the medical practice of a medical practitioner whose name is on the appointed day or at any time thereafter entered on a list prepared under section 33 (2) of the Act is to be maintained.

Compensation is to be paid on the lines set out in section 36 to practitioners whose names are on the appointed day entered on any such list, and subject to the provisions of section 37, to such practitioners only.

Practice in partnership is to be encouraged, and, except for the purpose of securing an equitable result, there should be as little interference as possible with the continued operation of existing partnerships.

Within the general principle of the prohibition of sale and purchases of goodwill, exceptions in relation to sales or purchase in pursuance of a partnership agreement existing at the appointed day are permissible, if they appear necessary to secure the equitable working of these principles in relation to doctors practising in partnership.

The possibility of legislation to make some addition to the sum of £66 millions, for which provision is made in section 36, in order to meet cases which might arise if doctors whose names were entered on a list at the appointed day were required, in pursuance of a partnership agreement existing at that date, to buy the goodwill of doctors whose names were not so entered, is not excluded if such an addition appears to be necessary in order to secure an equitable distribution of the £66 millions between doctors whose names are entered on a list at the appointed day.

Cost of the National Health Service

Sir ERNEST GRAHAM-LITTLE asked the Minister why the estimate for the National Health Service was already increased by more than £100 million a year, as compared with the estimate in the 1944 white-papers, command papers nos. 6502 and 6550; and if he would now give an estimate of what the service would cost when it was in full operation.—Mr. BEVAN replied: The scheme for a National Health Service outlined in command paper 6502 differed substantially from that set up under the National Health Service Act, 1946, so that estimates of cost of the two schemes are not strictly comparable. The estimates in command paper 6502 were prepared on the basis of pre-war services at the prices and levels of wages and salaries existing in 1943. The Parliamentary estimate is based on the proposed new services and current levels of wages and prices, which have substantially increased since 1943. The cost of the scheme in future years cannot be forecast, but on the basis of current costs, &c., a full year's working would involve an expenditure of about £230 million gross.

Ministry of Pensions Hospitals

Mr. GEORGE THOMAS asked the Minister of Pensions whether he would state the changes proposed in the administration of Ministry of Pensions hospitals after July 5 next.—Mr. GEORGE BUCHANAN replied: As Ministry of Pensions hospitals are not transferable under section 6 of the National Health Service Act, no change in administration is contemplated.

Obituary

JAMES McINTOSH

M.D., LL.D. ABERD.

As briefly announced last week, James McIntosh, of the Middlesex Hospital, died at Aberdeen on April 5 at the age of 65. For 28 years he had been professor of pathology in the University of London and director of the Bland-Sutton Institute of Pathology. A man of exceptional vitality, wide interests, and strong intellect, he made substantial contributions to bacteriology, and will be remembered gratefully by his many pupils in many parts of the world.

An Aberdonian born and bred, McIntosh was educated at Robert Gordon's College and Aberdeen University, where he qualified in 1905.

With an Alexander Anderson scholarship he went to Paris in 1906, to spend the next two years at the Pasteur Institute studying under Levaditi. It was this fortunate circumstance that finally directed him to pathology; at the Pasteur he worked on *Treponema pallidum*, and it was here also that his interest in virus diseases was first aroused.

On his return to Aberdeen he was awarded the M.D., with highest honours, for his thesis on spirochætoses, and was elected to the Carnegie research scholarship which he held in Aberdeen while continuing his work on *T. pallidum* and on *Spirochæta pertenuis*. In 1910 he became Grocers research scholar at the London Hospital under William Bulloch, to whose inspiration he was ever anxious to admit his debt. This period too marks the beginning of his long collaboration with Sir Paul Fildes on bacteriological problems, including the study of anaerobic bacteria, which led to the investigation and application of the principles of chemotherapy. Advances were then being made on the Continent in the diagnosis and treatment of syphilis, and McIntosh and Fildes added considerably to our knowledge both of the Wassermann test and of the treatment of syphilis with Ehrlich's new specific 606. On the chemotherapy side their attention was directed to the production and behaviour of drug-resistant strains of micro-organisms. At the same time McIntosh's interest in virus diseases was still evident, and he made some investigations into the ætiology of acute anterior poliomyelitis. It was during this part of his career that the influence of Henry Head can be first detected—an influence to which can be traced subsequent work on chemotherapeutic substances and the application of the Wassermann reaction to neuropathology.

During the first world war he made one of his principal contributions to medical science by his work on the isolation, recognition, and classification of the anaerobic bacteria of war wounds; the results outlined in the special report given to the Medical Research Committee long remained the classic on these infections. After the war he continued at the London Hospital, and in collaboration with H. M. Turnbull published the original description of postinfective encephalomyelitis.

Then, at the age of 37, McIntosh was appointed to a chair of pathology by the London University and became director of the Bland-Sutton Institute. A record of this part of his life is really a record of the history of the institute, but of much research, undertaken or inspired, special mention must be made of his further observations on the virus infections of the central nervous system, which he chose as the subject for his presidential address to the section of pathology of the Royal Society of Medicine. On the ætiology of postvaccinal encephalomyelitis he had serious differences with some of his colleagues, and in 1925 he wrote a minority report to the Minister of Health saying that he did not agree with the other members of the Andrewes Committee that infection by the vaccinia virus itself could be put out

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of account as a possible ætiological agent. In this he has since been fully justified.

In 1925 the experiments of W. E. Gye and J. E. Barnard reawakened interest in the Rous filtrable sarcoma, and McIntosh entered this field with a background of relevant experience. He became a faithful adherent to the virus theory and added much to our knowledge of virus diseases in relation to cancer. His experiments showing that filtrable tumours could be produced by chemical carcinogens brought together much of the work done by bacteriologists and chemists on carcinogenesis, and though it is not yet possible to assess its significance this may prove to be great.

The second world war made great demands on McIntosh's physique. As pathologist to sector v of the Ministry of Health Emergency Medical Service, and chairman of the London sector pathologists committee, he played a part in coördinating the pathological services of the London areas. Besides serving on the war wounds committee of the Medical Research Council, which entailed a large amount of work, he directed the two laboratories at Aylesbury in addition to the Bland-Sutton Institute, where he continued to do valuable work on chemotherapy. Despite these additional burdens, he managed to make time to carry on his other activities such as the treasurership of the Pathological Society of Great Britain and Ireland, and the chairmanship of the Board of Studies in Pathology.

The welfare of his technical assistants was of the deepest concern to him, and he served them well in the Pathological and Bacteriological Laboratory Assistants Association and (as it afterwards became) the Institute of Medical Laboratory Technology, acting as examiner, member of the examining board, and for three years as president.

Enough has been said to indicate his brilliant experimental flair, but it is impossible to convey his enthusiasm for his work and his capacity for arousing similar enthusiasm in others. To some extent his quality was obscured by contradictions in his character—contradictions such as every man shows but which in McIntosh seemed unusually prominent. Many did not see that his quick temper went, as so often, with a warm heart and a sensitive and sympathetic nature. In general his tendency was to self-effacement, but this contrasted with the strong line he would take in scientific discussions when he felt that he was in the right. His impatience in small matters was offset by much forbearance with major errors of judgment; his capacity for clear thinking and grasp of a problem was often masked by a difficulty in finding the words he needed. He had boundless energy in whatever he did, whether it was work, golf, photography, motoring, gardening, or the manifestation of a strong partisan spirit on the touchline. He had, too, the gift of inspiring loyalty—partly because of his energy and charm, but in no small measure because of his own loyalty to his subordinates and his understanding of them.

R.W.S.

James McIntosh went to the Middlesex as professor at the same time as I entered the hospital as a student. I knew him as a teacher and afterwards as a chief and a friend during more than fifteen years. Nobody could call him a good lecturer, a good public speaker, or a good committee-man. Shyness, which he never overcame, accounted for his deficiencies in the first two accomplishments, while a temperament impatient of opposition made him difficult in debate and unreasonable in his demands. But in his own department, surrounded by those he liked, he was a tower of strength. His original and critical mind not only dictated his own first-class research but also guided and stimulated those who worked with him. He was a master of bacteriological technique, and ingenious with mechanical invention or with modifying or improving some piece of apparatus, sometimes to the despair of the hospital engineers. He always had a happy department, in which he exercised just the right amount of shrewd and fatherly supervision, without in any way restricting the freedom or the action of his staff whom he liked to work out their own ideas.

"Mc" was an excellent golfer but a bad loser. He was a Scot to the bone and intensely conscious of the national prestige. It was sheer misery to accompany him to see the Calcutta Cup match. If Scotland lost he would mope for days; if Scotland won his triumph was insufferable. But all his staff admired, respected, and loved him as much in his weaknesses as in his strength. As a guest in a home his natural charm was delightful, and he had that way with young children which is so often to be found in shy bachelors.

L.E.H.W.

EDWARD DEANESLY

M.D., B.SC. LOND., F.R.C.S.

Edward Deanesly, formerly surgeon to the Wolverhampton General Hospital, who died on March 31 at the age of 82, made an outstanding contribution to the advancement of surgical practice in the Midlands.

He was educated at King's School, Bruton, and at the age of 16 went to University College, London. In 1886 he graduated B.SC., and the following year he took his M.B. with first-class honours in forensic medicine. In 1888 he obtained the M.D. and in 1890 the F.R.C.S. After holding house-appointments at U.C.H., he in 1893 was appointed house-surgeon to the Wolverhampton and Staffordshire General, now The Royal Hospital, Wolverhampton, and until his retirement in 1931 his life was identified with that of the hospital. He early recognised the supreme importance, particularly in an industrial population, of the proper treatment of wounds, especially of the hands, and when he gave up his resident post in 1895 to enter general practice in Wolverhampton he became honorary casualty officer to the hospital, a post created at his own request. His few years in general practice enabled him to gain a thorough knowledge of the early stages of surgical disorders, and he always considered them to have added enormously to his judgment and efficiency as a surgeon.

There was no branch of surgery in which Deanesly was not at home. He himself regarded his work on the surgery of the kidneys and ureters as his most important contribution to medicine, and he was the first to describe the difference between ruptures of the urethra caused by direct violence and by fractures of the pelvis. But possibly the technique which he developed in the treatment of recently inflicted wounds was even more important. He never allowed himself to be diverted into an increasingly elaborate aseptic technique, and he recognised that such technique is of little help in dealing with wounds deeply contaminated or already septic.

Early in his career he began to treat the large bruised and lacerated wounds produced by factory or street accidents by dissecting out, after proper cleansing, the whole surface of the wound however deep, including all tissue too damaged to recover; he then closed the wound without stitches by a firm absorbent dressing and left it undisturbed for at least a week. He taught this practice to all his house-surgeons twenty years before it was accepted as official routine in the R.A.M.C. in the middle of the first world war. He strove without ceasing for the recognition of the importance of the casualty department, especially in a hospital serving an industrial area, and sought to organise the department of his own hospital so that injuries of hands and limbs, apparently trivial but always potentially serious, should not be left to be treated by inexperienced residents and nurses.

The Royal Hospital, Wolverhampton, is his standing monument. With his usual vision Deanesly early saw that for a hospital to attain to the first rank its staff must embody a proportion of consultants and specialists, and he persuaded the board of management to adopt the then almost unheard-of step of offering financial inducement to men of promise to come on to the honorary staff. Recognising the need to apply pathology in medical practice, he also persuaded the board to build the nucleus of the present pathological department.

One of the original members of the Surgical Union, now the Provincial Surgical Club, Deanesly visited with these colleagues many Continental centres of surgery. Before the work of the hospital engrossed the whole of his time he also took an active part in the civic life of Wolverhampton. He was elected a member of the town council in 1901 and served on the education committee; he resigned in 1917—it is usually supposed to escape

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being made mayor. He was appointed a justice of the peace in 1918.

By nature a conservative and a traditionalist, Deanesly never closed his mind to new ideas or ways of thought; his principle was to test all things and hold fast that which is good; but before accepting it he required clear demonstration that a new way or idea actually was good. He hated cant, and his forceful and forthright personality made him impatient of minds less clear and less honest than his own. His mordant tongue and gift of sustained irony, combined with an impressive delivery, made him a stimulating if somewhat alarming speaker on public occasions. In private his quick wit, never better displayed than over the dessert and wine among friends, always assured fruitful conversation. He read, widely and deeply, particularly in philosophy and history, and to the end of his life maintained his interest in the classics.

When he retired Deanesly was appointed a vice-president of The Royal Hospital. He settled in Cheltenham, but shortly after the outbreak of the second world war he moved to Llanbedr in Merionethshire, where he died. His widow, daughter of the late Alderman John Marston, of Wolverhampton, survives him together with two sons and three daughters. S. C. D.

Appointments

BURSLEM, R. W., M.D. Manc., M.R.C.O.G.: resident obstetrician and gynæcologist, City Hospital, Chester.
HARLEY, DAVID, M.D., B.SC. Edin., F.R.I.C.: allergist, Moorfields, Westminster, and Central Eye Hospital.
LOVIBOND, J. L., M.A., M.D. Camb., F.R.C.P.: asst. physician, Westminster Hospital.
MURRAY, CHARLOTTE, M.D. Berlin: asst. county M.O. (psychiatrist), Kent.
SLORACH, JOHN, M.B., B.SC. Aberd., D.P.M.: deputy medical superintendent, Park Prewett Hospital, Basingstoke.

Guy's Hospital, S.E.1:

KAUNTZE, RALPH, M.B.E., M.A., M.D. Camb., M.R.C.P.: asst. physician.
LEWIS, T. L. T., M.B. Camb., F.R.C.S.: asst. obstetric surgeon.

Regina General Hospital, Saskatchewan:

GILMOUR, MARION, B.SC., M.B. Glasg.: clinical pathologist, Regina General Hospital.
LINN, T. L., B.SC., M.B. Glasg.: asst. pathologist, Regina Grey Nuns' Hospital.
MCLETCHIE, N. G. B., M.D. Glasg.: director of laboratories, Regina General and Grey Nuns' Hospitals, and consulting pathologist, Saskatchewan Cancer Commission.

Ministry of National Insurance:

Principal M.O.:
COLLINS, F. M., M.A., M.B., M.CHIR. Camb., F.R.C.S.
DAVIDSON, J. M., M.D. Edin., D.P.H.
GROSVENOR, C. J. P., M.A., M.B. Camb.
Senior M.O.:
BRUNYATE, W. D. T., D.M. Oxfd, D.P.H.

Births, Marriages, and Deaths

BIRTHS

ALLEN.—On April 4, in London, the wife of Dr. S. J. Allen—a son.
BUCKLER.—On April 9, at Bath, the wife of Dr. F. R. Buckler—a son.
CHRISTIE.—On April 4, the wife of Dr. D. E. Christie—a daughter.
DEARLOVE.—On April 3, the wife of Dr. Arthur Dearlove—a son.
GRANT.—On March 24, at Cardiff, the wife of Mr. H. M. Grant, F.R.C.S.E.—a son.
GROVE.—On March 25, at Hunstanton, the wife of Dr. W. S. Grove—a daughter.
NICHOLSON.—On April 2, in London, the wife of Dr. B. Nicholson—a daughter.
POULTON.—On April 6, the wife of Dr. E. M. Poulton—a daughter.
YUDKIN.—On April 3, in London, the wife of Prof. John Yudkin—a son.

MARRIAGES

GRAY—HAMPTON.—On April 3, at Bidston, Harry Richardson Gray, M.B., to Lesley Frances Hampton.
HOUSTON—WRIGHT.—On April 7, at Dorking, George Frederick Houston, M.B., to Mollie Alice Wright.
PITT—REYNOLDS.—On April 3, in London, Neville Maxwell Francis Peter Pitt, M.R.C.S., to Penelope Reynolds.
WILLIAMS—FORD.—On Jan. 7, at Chester, Hugh Osborne Williams, F.R.C.S., to Hazel Vivienne Ford.

DEATHS

CALTHROP.—On April 7, Gordon Thomas Calthrop, M.D. Camb., D.P.H., D.M.R.E.
GOLDIE.—On April 6, at Richmond, Eric Avery Gordon Goldie, A.F.C., M.A., M.B. Camb.
HOUGHTON.—On April 6, at Berkhamsted, Leonard Frank Houghton, M.R.C.S.
MCINTOSH.—On April 5, at Aberdeen, James McIntosh, M.D. Aberd., LL.D.

News

Royal College of Surgeons of England

A meeting of fellows will be held at the college on Wednesday, April 28, at 4.30 P.M., to discuss the National Health Service Act in relation to the plebiscite recently taken by the British Medical Association.

The college, with the Institute of Child Health, will hold a course of lectures on the surgery of childhood from June 7 to 22. The lectures will be given at the college, Lincoln's Inn Fields, W.C.2, at 5 P.M. each day.

Society of Apothecaries of London

Prof. E. C. Dodds, F.R.S., master, presided at a recent meeting of the court of assistants, when it was resolved to forward a resolution to the British Medical Association expressing the hope that further negotiation between the Minister of Health and the profession would be made possible.

It was announced that Sir Lionel Whitby would receive the society's gold medal in therapeutics on July 7.

The following were clothed by the master with the livery: James Robin Robertson, Johnson Theodore Robinson, and Henry Michael John Rowan.

The following were admitted to the freedom of the Society by redemption:

Eric Arthur Wright, Gerald Maurice Joseph Slot, Reginald Alfred King, Arthur Dickson Wright, Maurice Charles William Long, Henry Cohen, and Sir Frederick Michael Wells (lord mayor of London).

J. L. Struthers was bound apprentice to J. A. Struthers for four years.

The diploma in industrial health was granted to:

A. M. Critchley, D. Fowler, V. O. B. Gartside, A. French, R. Swinburn, S. A. Underwood.

The diploma of L.M.S.S.A. was granted to:

E. F. Jones, L. T. Al-Badri, M. K. A. El Banhawy, C. F. M. Fisher, W. L. M. Garsia, D. J. Sheerboom, I. F. Dajani, S. K. A. D. J. Bernhardt, E. L. Gilbert, C. K. Cumming, P. C. J. Nicholl, C. H. J. Van Aswegan, M. P. Coplans, M. J. Bhavnani.

South-East Metropolitan Region

The following have been appointed chairmen of hospital management committees for some of the hospital groups within the region:

Darenth Park, Sir Frederick Wells; Mid-Kent, Mr. C. P. Whitehead; Mid-Sussex, Mr. D. G. Pelly; Canterbury, Mr. Edward Mount; Barming Heath, Captain H. G. Giffard; Leybourne Grange, Mr. H. E. Andrews; Haywards Heath, Mr. T. E. Morris; Hellingly, The Hon. Ruth B. Buckley; Chartham, Councillor J. H. Johnson.

South-West Metropolitan Region Psychiatric Advisory Group

The time of the meeting which this group is holding at the County Hall, Kingston-upon-Thames, on Wednesday, April 21, has been altered from 2.30 P.M. to 5 P.M.

Travelling Fellowships

The Medical Research Council invite applications for the following travelling fellowships for the academic year 1948–49:

Rockefeller medical fellowships.—These fellowships are provided from a fund with which the council have been entrusted by the Rockefeller Foundation of New York. They are intended for graduates resident in this country who have had some training in research work in clinical medicine or surgery, or in some other branch of medical science, and who are likely to profit by a period of work at a centre in the United States or elsewhere abroad, before taking up positions for higher teaching or research in the United Kingdom. The stipend will ordinarily be at the rate of £525 per annum for a single fellow, and of £800 per annum for a married fellow. Travelling expenses and some other allowances will be paid in addition.

Dorothy Temple Cross research fellowships in tuberculosis.—These fellowships are awarded by the council from a special endowment of which they are the trustees. The object of the fellowships, as defined in the trust deed, is to give special opportunities for study or research to suitably qualified British subjects of either sex "intending to devote themselves to the advancement by teaching or research of curative or preventive treatment of tuberculosis in all or any of its forms." The fellowships will, as a rule, be awarded to candidates who wish to make their studies or inquiries elsewhere than in the United Kingdom. They will ordinarily be awarded for one academic year. The fellowships provide for the payment of stipend, together with an allowance for travelling and incidental expenses. The stipend will ordinarily be at the rate of £525 per annum for a single fellow, and of £800 per annum for a married fellow.

Applications must be lodged with the council not later than June 1, 1948. Further particulars and forms of application are obtainable from the secretary, Medical Research Council, 38, Old Queen Street, Westminster, S.W.1.

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Ministry of Health

Mr. W. G. Senior has been appointed principal dental officer of the Ministry in succession to Mr. H. A. Mahony, who has retired.

Institute of Laryngology and Otology

On Thursday, May 6, at 3 P.M., at the institute, 330, Gray's Inn Road, London, W.C.1, Dr. Jean Leroux-Robert, of Paris, will describe a modification of laryngectomy, illustrated by a cinematograph film.

Public Health and Municipal Engineering Congress

This exhibition, the first since 1938, is to be held again this year at Olympia, London, from Nov. 15 to 20, and the organisers have published a brochure, entitled *A Century of Public Health*, describing the progress made since the first Public Health Act in 1848. The organiser is Mr. J. Pattisson, 68, Victoria Street, S.W.1.

Society of Public Analysts and other Analytical Chemists

The biological methods group will hold a meeting on Tuesday, May 11, at 6.30 P.M., at Burlington House, Piccadilly, London, W.1, when Dr. A. A. Miles, head of the standards department of the National Institute for Medical Research, will read a paper on Biological Standards.

Lebanon Hospital for Mental Disease

The annual meeting of this hospital will be held at the Cora Hotel, Upper Woburn Place, London, W.C.1, on Thursday, April 22, at 4.30 P.M., under the chairmanship of Mr. H. Lyn Harris, LL.B. Mr. R. de C. Baldwin and Dr. W. M. Ford Robertson, who spent a month at Asfuriyeh last autumn, will report on the work of the hospital.

Research in Disseminated Sclerosis

A scholarship has been endowed at the Middlesex Hospital medical school for research in organic nervous diseases. The work will be carried out under the direction of the physician in charge of the department for nervous diseases, and the subject chosen is disseminated sclerosis. Dr. N. D. Compston has been appointed scholar for 1948–49.

Air Nursing Attendants

In Berkshire the St. John Ambulance Brigade have set up an air unit consisting of 19 members specially trained as attendants for patients travelling by air both in this country and overseas. A booking fee of £2 is payable, and after the first 24 hours 10*s*. per day is charged. Applications should be sent to Miss S. M. George, officer i/c 1st St. John (Berkshire) Air Unit, S.J.A.B., 109, Oxford Road, Reading (Tel. : Reading 4147). Further units of this sort are planned for other parts of the country.

Mrs. Roosevelt at Netherne Hospital

On April 9 Mrs. Roosevelt visited Netherne Hospital, Coulsdon, Surrey. She saw the chapel, the nurses' training school, the female occupational-therapy department, the patients' canteen, the staff and patients' cafeterias, the insulin bay, an operating-theatre, the art studio, three of the reception wards, the library and reading-room, the hairdressing saloons, the laboratories, a display of occupational therapy, and an exhibition of the patients' pictures. A number of the Women's Voluntary Service workers who have assisted in the hospital for the past two years were introduced to her.

Central Council for Health Education

The council is strengthening its headquarters team of lecturers so that it can hold throughout the country regional courses of lectures on health education, which will be open free of charge to professional workers nominated by local authorities. Other plans for the future include the appointment of an exhibitions officer and the outlay of several thousands of pounds on exhibition material. This material and the services of the officer will be available free of charge to local health authorities. The publications section of the council is also to be extended and the production of visual teaching aids is to be developed. To make possible these extensions the council has been obliged to close its area offices except in Northern Ireland, but it is hoped that the free services that it will shortly be able to offer from London will compensate in part at least for the loss of intimate local liaison.

Central Midwives Board

Mr. Arnold Walker has been re-elected chairman and Mr. J. P. Hedley, vice-chairman.

Society of Chemical Industry

At the meeting of the society to be held in Edinburgh in July, Sir Robert Robinson, P.R.S., will deliver the Lister lecture on Thursday, the 15th, at 10 A.M. He is to speak on the Device of Imitation of Molecules in the Biological Field.

Children's Hospital, Sheffield

Mr. R. B. Zachary has been appointed full-time pædiatric surgeon to the hospital.

Mr. Zachary, who is 35 years of age, was educated at St. Michael's College, Leeds, and the University of Leeds. After taking his B.PHARM. in 1935 he turned to medicine, and in 1940 he graduated M.B. with first-class honours and was awarded the gold medal. Three years later he took his F.R.C.S. He was a demonstrator in anatomy in the university and a house-surgeon at the General Infirmary, Leeds, before he joined the staff of the Wingfield-Morris Hospital in Oxford as a house-surgeon, and later he became first assistant to the Nuffield professor of orthopædic surgery. During the war Mr. Zachary was chiefly interested in problems of nerve suture, and he chose as the subject of his Hunterian lecture in 1944 Recovery after Nerve Suture. Since then he has published papers on primary suture of nerves, thenar palsy, and tendon transplantation. At present he is working with a Nuffield fellowship with Dr. R. E. Gross at the Children's Hospital, Boston.

CORRIGENDUM.—Dr. J. G. Greenfield's lecture on the Pathology of Encephalitis will be given at the Institute of Psychiatry, Maudsley Hospital, London, S.E.5, today, Friday, April 16, at 2 P.M., and not at the Institute of Neurology as stated in our diary last week.

Diary of the Week

APRIL 18 TO 24

Monday, 19th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
6.15 P.M. Prof. D. T. Harris: Physiology of Respiration.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS, 58, Queen Anne Street, W.1
NOON. Dr. R. M. Haines: Pathology of Ovarian Tumours.
5 P.M. Mr. A. C. Palmer: Surgical Treatment of Procidentia.

HUNTERIAN SOCIETY
7 P.M. (Talbot Restaurant, London Wall, E.C.2.) 8.30. Mr. A. L. Bacharach, F.R.I.C.: Laboratory Animals—Their Uses and Abuses.

ROYAL SOCIETY OF ARTS, John Adam Street, Adelphi, W.C.2
4.30 P.M. Dr. Frankis Evans: Recent Advances in Anæsthesia. (Second of three Cantor lectures.)

Tuesday, 20th

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Dr. Katherine Lloyd-Williams: Anæsthesia in Obstetrics.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS
NOON. Dr. Haines: Curettings and Biopsy.
5 P.M. Mr. F. E. Stabler: Breech Presentations.

EDINBURGH POSTGRADUATE BOARD FOR MEDICINE
5 P.M. (Royal Infirmary.) Prof. F. A. E. Crew, F.R.S.: Medico-Sociological Aspects of Marriage.

Wednesday, 21st

ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS
NOON. Prof. O'Donel Browne: Third Stage of Labour.
5 P.M. Dr. R. D. Lawrence: Diabetes in Pregnancy.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Prof. L. S. Penrose, F.R.S.: Influence of Heredity on Disease.

Thursday, 22nd

ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS
NOON. Prof. W. C. W. Nixon: Action of the Uterus in Labour.
5 P.M. Dr. Harold Waller: Management of Breast-feeding.

ROYAL SOCIETY, Burlington House, Piccadilly, W.1
4.30 P.M. Dr. A. N. Drury, F.R.S.: Lister Institute of Preventive Medicine—Early History and Development.

HONYMAN GILLESPIE LECTURE
4.30 P.M. (Edinburgh Royal Infirmary.) Prof. L. S. P. Davidson: Folic Acid—Indications and Contra-indications.

Friday, 23rd

ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS
NOON. Dr. H. C. McLaren: Cervical Physiology.
5 P.M. Mr. M. W. B. Bulman: Midwifery in an Agricultural Area.

Saturday, 24th

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES
2.30 P.M. (11, Chandos Street, W.1.) Mr. J. Johnston Abraham: History of the Treatment of Venereal Disease.

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HISTORICAL BUILDING
DES MOINES, IOWA

SOME ASPECTS OF OLD AGE *

J. H. SHELDON
M.D. Lond., F.R.C.P.

DIRECTOR OF MEDICINE AND SENIOR PHYSICIAN, THE ROYAL HOSPITAL, WOLVERHAMPTON

THE subject of old age, in spite of an initial prospect of dullness, turns out to be as rich in excitement as any other branch of medicine, and the survey, made during the last two years, of a random sample of 1 in 30 of the old people in Wolverhampton has brought to light numerous intriguing facts.

The sample comprised 477 people of all grades of income level,† over the age of 60 for women and 65 for men, these being the ages at which an old-age pension becomes available.

PHYSICAL ASPECTS

Sex Differences

The physical state of every old person in the sample was assessed and graded as normal, normal-plus, or subnormal in relation to age. Apart from its inherent difficulties the assessment was obviously entirely subjective, but the fact that the results were not seen until the survey had been completed tends to make the assessment consistent for the whole sample.

Fig. 1 shows that the proportion of women with subnormal physique increases with age (which is what one would expect) until a proportion of 70% was reached in women aged 85 or more. At the same time the proportion of women with exceptionally good physique diminishes with age until a proportion of 4% was reached in women aged 85 or more. The proportion of women in average health remains fairly constant until the age of 85 and over, when there is a distinct drop. The women therefore show a steady reduction in general physique as their age increases.

The men show a different picture. The proportion of men with subnormal physique also increases with age, though to a less extent than in the women, but the distribution of those with supernormal physique is very different. The proportion of men with supernormal physique decreases with age in the earlier age-groups, but it suddenly increases at the age of 80–84, and for that age and over it forms 50% of the sample. This increase is due to a fall in the proportion of men with normal physique from 41% in the age-group 75–79 to 17% in the age-group 80–84 and none at the age of 85 or more. Thus the very old men have either unduly bad health or remarkably good health for their age.

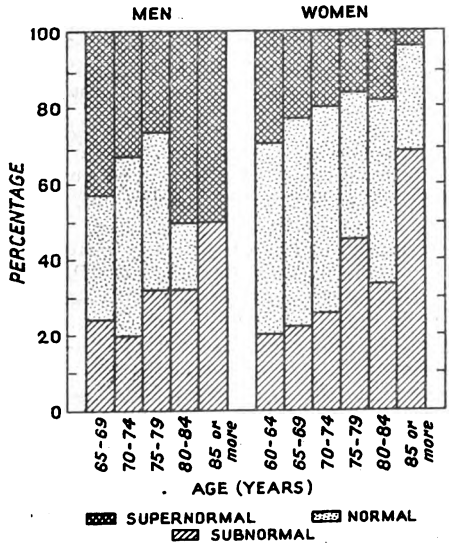

Fig. 1—Physical states of old people.

This difference between the sexes is borne out by their morbidity-rates for the various conditions studied in the survey. Except for gout and bronchitis, the women were almost invariably more often affected than the men. On the other hand, the mortality was much less among the women than among the men. It is well known that there are more old women than men—the present sample contained 266 women to 143 men above the age of 65. It is clear that there is a considerable difference between the two sexes in that elusive but undoubted quality called a hold on life. Women possess this in greater abundance than men and consequently can survive them, even though they are disabled by poor health to a much greater extent than men. The numbers in the later age-groups of our sample are small, but the finding is sufficiently striking to justify further investigation on random samples elsewhere.

Deafness

The incidence of deafness of all grades of severity is shown in fig. 2. The curves are essentially similar in both sexes and show a steadily rising incidence up to the age of 80–84, after which the incidence appears to be stationary. At the age of 80–84 more than 60% of both sexes have defective hearing, and the way in which the incidence increases steadily to this height strongly suggests a steady decline in cochlear function of senile origin.

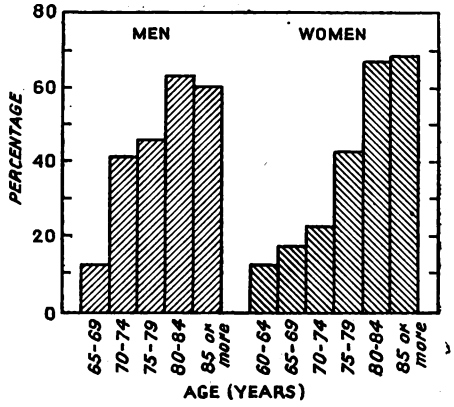

Fig. 2—Deafness in old people.

Vertigo

Vertigo is a most important and distressing symptom of old age which has never received the attention it deserves. Its incidence (fig. 3) is clearly different in the sexes. In the men there is a maximal incidence in the age-group 75–79, and the incidence before and after that age suggests variation about a mean. In the women, on the other hand, the incidence, after attaining a maximum in the age-group 70–74, remains steady until it finally rises at the age of 85 or more, when the proportion of affected women is 70%.

The reason for this sex difference is not clear, and the question deserves closer investigation. In making this survey no physical examination was possible, and only the symptom of vertigo was in question and not its causation, but it is clear that the various mechanisms capable of producing vertigo participate to a different extent in the two sexes. If a senile decline of labyrinthine function is an important cause of vertigo in later life, corroborative evidence could be obtained from a study of other aspects of labyrinthine function. Unfortunately a question on tinnitus was not included till towards the end of the survey, but difficulty in the dark and liability to fall, two other aspects of old age that have a distinct bearing on this question, were investigated.

Difficulty in the Dark

It is well known that old people are averse to going out by themselves in the dark, and that many of them experience considerable difficulty in doing so. A question

* Abridged from a Holme lecture delivered at University College Hospital medical school on Jan. 8, 1948.

† A detailed account of the findings is published in the book reviewed in an annotation.

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was therefore asked about this, and the results are shown in fig. 4, which shows that this symptom increases steadily with age, and that women are much more affected than men, with the result that by the age of 85 or more 90% of women are affected.

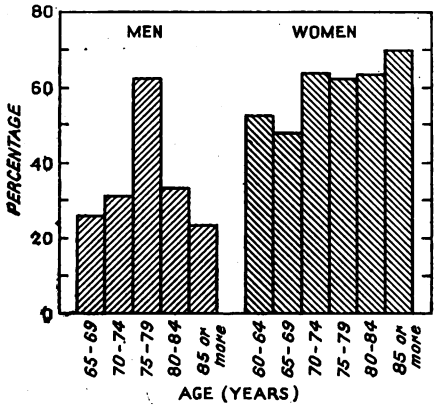

Fig. 3—Vertigo in old people.

Difficulty in the dark, therefore, is clearly so common a result of old age that it may almost be regarded as normal for that stage of life. The dark imposes a strain on labyrinthine and kinæsthetic function because it reduces to a minimum the information about the position of the body in space derived from the eyes, and there is little doubt from the numerous histories given me by old people concerning this difficulty that the main reason lay in a decline in function of the labyrinthine and other postural senses.

An old man of over 80 was in the habit of getting out of bed to pass urine at night, using a regular series of movements which by long practice had become almost automatic. He leaned over and out of bed, holding on to its side while he bent down to reach the chamber, after which he could stand up and pass urine.

One night, however, he omitted the first movement, that of holding on to the side of the bed, with the result that he apparently went too far and could not at once touch the chamber. He then stood up and lost all sense of orientation, which he found very frightening, and eventually he found out where he was only by falling against the door some distance away from the bed.

He was a doctor, and in discussing the incident he was of opinion that the main fact was a decline in the power of recent muscular and labyrinthine memory, with the result that, when he found himself standing up, there was no clear memory of the preceding movements which had brought him there; and, even though he was erect, his labyrinth was unequal to the task of keeping him so indefinitely without the help of his eyes, and he finished by tumbling.

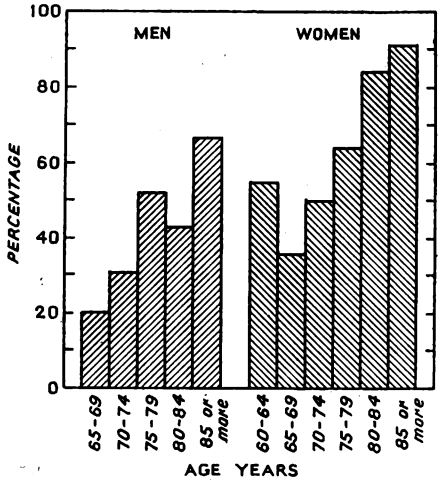

Fig. 4—Difficulty in the dark experienced by old people.

A similar incident befell an old man living in a two-roomed cottage, who in going from one room to the other at night prematurely extinguished the light in the first room, and at once lost all sense of direction, and became very frightened and confused.

This aspect of old age should be amenable to experimental study, and it is worth while here to emphasise its importance in the lives of old people.

Liability to Falls

The incidence of liability to tumble—a well-known disability of old age—in the present sample is shown in fig. 5. From 65 to 84 both sexes show a steady increase in this liability. The women are more affected than the men, 70% of the women being affected at the age of 80 or more. The reduced incidence after the age of 80 is probably due to the presence in those years of a number of old people who have no opportunity to fall because they are confined to bed. The rising incidence between 65 and 80, however, suggests a phenomenon directly due to the operation of age.

Figs. 3, 4, and 5 appear to provide prima-facie evidence of a steady decline with age in the function of the various factors concerned in maintaining normal posture, including the labyrinth and the muscular senses. These charts also draw attention to a clinical problem which has never received the attention it deserves. In a recent and comprehensive textbook on old age, reaching to nearly a thousand pages, neither vertigo, nor difficulty in the dark, nor liability to falls is mentioned.

That there is clearly room for investigation is shown by a study of why old people are liable to fall. The matter is of considerable practical as well as theoretical interest, in view of the well-known liability of old people to injure themselves in these falls. In all cases where falls had occurred to old people encountered in the survey details were taken, and it proved possible to classify the falls into four types of mechanism, some of which could be in operation together.

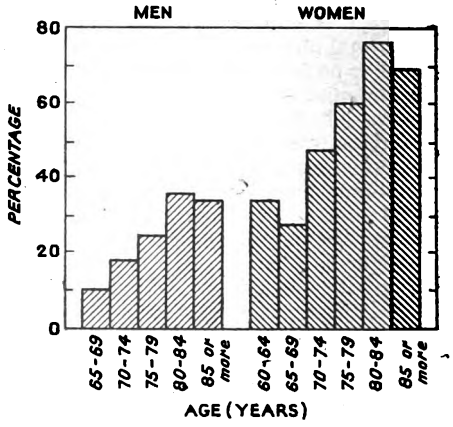

Fig. 5—Liability of old people to falls.

In 35% of cases the falls were directly due to attacks of vertigo—of whatever origin—and so may be ascribed to the labyrinth. (In 10% of these the people had managed to save themselves by clutching hold of something.)

The next largest group, comprising 31% of falls, were due to a greater liability to trip, and the old people invariably ascribed falls of this kind to the fact that they did not lift their feet so high as when they were younger. Such falls tend to occur in the course of forward movement, and so are apt to lead to serious injury; they are indeed the most frequent cause of the most dangerous type of fall of all—when the old person is coming downstairs. The question whether old people do in fact not lift their feet so high as younger people has never been put to the test of direct measurement, but this should not be difficult, and it would be of considerable interest to know whether the undoubtedly greater liability of old people to trip is really due to this cause resulting in their catching their feet on trivial excrescences, such as the edge of a carpet.

It is impossible to deal adequately with this cause of falling without referring also to the next group, of 10%, caused by a difficulty in recovering balance. Many old people will say "Once you're going you've got to go—

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you can't stop yourself," and they say that though they are fully conscious of what is happening they cannot make the necessary corrective movements in time, or with sufficient force, to restore their balance. This implies a failure of the central nervous mechanisms subserving posture. Certain movements put a strain on the adaptive postural mechanisms and are apt to cause an immediate fall in old people which they may be helpless to prevent. The most common of these is the change in the centre of gravity caused by throwing the head backward. One woman told me that she could not replace a broken electric-light bulb because she could not put up her head, and another woman could not use the top shelf in the larder for the same reason.

The last group of falls, comprising 24%, are the most difficult to understand. In this type of fall the old person may either be standing still or moving quietly about, when one or both legs suddenly give way, and without loss of consciousness the old person falls suddenly to the ground. The sufferers can say nothing more than that the limb suddenly gives way, without warning and without any previous feeling of tiredness. A further peculiar feature about these falls is that the old person may then be unable to get up for some time—estimated to be sometimes as much as an hour—and the reason given is that it takes this time for "the strength to come back," and until that happens the victim is forced to lie on the floor. Relations who have witnessed this type of fall all say that the old person is extremely difficult to lift, because he is "a dead weight." This may imply that the muscles are toneless, but a similar description could arise from an excess of muscular tone, causing rigidity, and only immediate observation can settle this point. These falls are perhaps due to involutionary changes in the central mechanisms responsible for the maintenance of postural tone, in consequence of which they fail at times to function at all. The description given by the relatives is reminiscent of a cataplectic attack in a younger person.

Considering that 68% of women aged 85 or more are deaf, 70% suffer from vertigo, 70% from a liability to tumble, and 90% from difficulty in the dark, it seems almost certain that these are manifestations of a senile decline of function in the whole inner ear and its central connexions.

SOCIAL ASPECTS

"*Living Alone*"

The great majority of old people live in private houses, and only a small minority in institutions. The proportion

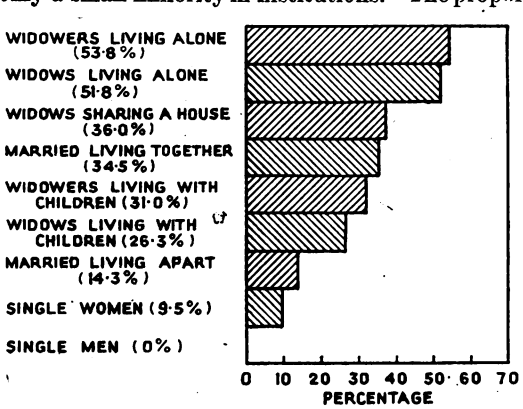

Fig. 6—Old people with relations living near.

varies from place to place, but it is probably generally true that about 95% live at home and only 5% in institutions. Of the present sample, 98% lived at home and only 2% in institutions. The social problems involved are therefore essentially domestic rather than institutional.

Many statistics of old age give the percentages of old people "living alone"—usually 10–20%, varying somewhat from district to district. These figures are misleading in that they suggest that a large proportion of old people are living detached, isolated, and lonely lives.

What does the phrase "living alone" really mean? A widower who is the householder and the sole occupant o the house appears in any official return as living alone. But if a married daughter lives next door and comes in every day to get a meal for him, while he goes into his daughter's house for a smoke in the evenings and a meal on Sundays and does part of the shopping for both houses, and if when he is ill his daughter comes in to nurse him, is he really living alone? Or if a widow is the householder and sole occupant of the house but has a married daughter living six doors away, and an electric bell has been fitted between them, so that when the old lady has peeled the potatoes she rings the bell for her daughter to come in and put the saucepan, which is too heavy for her, on the stove, is she really living alone? Clearly in these instances the phrase "living alone" is only true in an architectural sense and obscures the real truth that the old person is part of a family unit spread over two or more houses, which functions loosely in health but becomes more closely knit in times of stress.

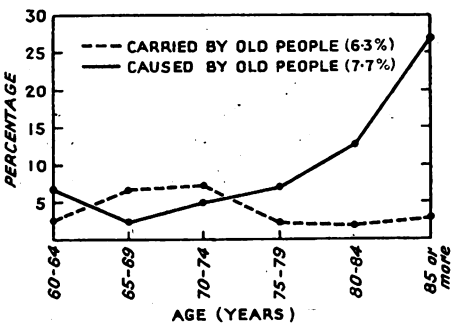

Fig. 7—Strains carried by and caused by old people.

In the present survey special care was taken to inquire into this aspect of the social biology of old age, with surprising results. In the figures which follow the phrase "relations living near" applies to children in over 80% of cases, the remainder being those cases where two old people who are related—e.g., two married sisters—live near each other. In the present sample 4% of the old people have children living actually next door, and 6% have children living not more than three houses away from the old person; 10% of old people have relations living in the same street, and 20% have relations living within half a mile—i.e., within a distance in which a hot meal can be carried from one house to the other without needing reheating. Finally, 40% of old people made regular daily contacts with their children, wherever the latter might live. It is therefore clear that old people do not lead such isolated lives as the figures for those ostensibly living alone suggest; in fact a detailed analysis of the survey findings showed that only about 5% were in fact living alone apart from casual contacts.

The Family Unit

The importance of children living near their parents is confirmed in fig. 6, which shows that more than half the widowers and widows ostensibly living alone have relations living near; it is clear that in many cases the decision of an old person, after the death of the spouse, to go on living alone is largely based on whether there are children living near. Many old people, as well as their younger relations, insisted that this is much the best arrangement, since they are thereby enabled to retain their independence. As one old woman told me, "It's grand, because you can each go your own way, and when there's trouble all you've got to do is to knock on the wall."

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Fig. 6 also shows that the proportion of old people having relations living close diminishes through the other types of domestic structure to reach a minimum in single men and women. These, being childless, are dependent on other relations, a fact which considerably limits their choice; yet almost 10% of single old women have chosen residences which bring them near such relations. By contrast, the single old men were without such contacts. These represent a class of great psychological interest, for they were almost without exception free from loneliness, being for the most part somewhat eccentric characters who were essentially "solitaries" and quite happy with a minimum of human contact. One cannot help making a comparison with a similar psychological state found in the males of some of the other larger mammalia—where the old bull roams by himself.

It is clear that the family is the unit in the case of most old people, but even this generalisation is really not quite wide enough, and it would be truer to state that they mostly form part of a group. This can best be seen by considering the nursing of old people when they are ill. When old men are ill at home, their nursing is made up from the following sources: wives 44·7%; daughters 25%; daughters-in-law and other relations 10%; and neighbours 18·8%. When old women are ill, the nursing is done by: husbands 9·7%; daughters 39%; daughters-in-law and other relations 22%; and neighbours 28%. Neighbours therefore contribute 18% of the nursing of old men and 28% of that of old women. A study of the social and psychological factors involved in "good neighbouring" would be of great interest, and it is to be hoped that some general practitioner will give us the information on this subject that only he can provide. One of the strong impressions left by the survey was of the power of the group feeling in human relations, in which the family formed the major item but to which the neighbours contributed a by no means negligible quota.

In surveys of this kind all sorts of curious facts come to light, each of which suggests a fascinating subject for further inquiry. Such a one is the distribution of children living in the same street as their parents. Of the children living either next door to or within three houses away from their parents, 71% were daughters and only 29% sons. On the other hand, of the children living further up the street 58% were sons and only 42% daughters. The presumption is that daughters like to settle down near their parents, but that sons, though willing to live sufficiently close to be a standby in times of stress, are not going to live so close that there is any possibility of interference with their own married life. That is by no means the whole picture, however, and an essential preliminary would be to find how many of the sons at the other end of the street were living next to their parents-in-law.

The general observation is undoubtedly true that no inquiry into the social status of old people that confines its scope to the actual household of the old person will get at the true state of affairs, and for this reason bare statements of the proportion of old people ostensibly living alone reveal only a small part of the truth.

Strains and Stresses

It is not to be supposed that old people can live in such close contact with the rest of the community without the development of strains, and in making the survey particular note was taken of this possibility. The strains, however, present a continuous series from an occasional minor inconvenience to a crushing burden which reduces the bearer to the status of a drudge. In the present sample no less than 7·7% of the old people were causing stresses of this severity on the younger generation, and this is an important figure when it is remembered that only 2% of the sample were under institutional treatment. Hence there are nearly four times as many old people requiring assistance as receiving it.

Yet it would be most unfair to the old people to regard them merely as the cause of strain on the younger generation, for 6·3% of the old people were themselves carrying a strain of this severity. There is a well-marked difference between the age-incidence of the two groups (fig. 7). Of old people carrying strain the proportion falls rapidly after the age of 70–74, because however willing they may be they no longer have the strength to carry on after that age. By contrast the proportion of old people causing strain rises rapidly after this age, and at the age of 85 or more it is 26%.

There are three main types of strain borne by old people: the bringing up of grandchildren; the care of defective children; and, by far the heaviest burden, the nursing and general care of a beloved spouse in a final illness. In most cases it is the old woman who looks after a dying husband; and the strains so created may be so severe that women who have borne and reared a large family entirely by the light of nature and without professional assistance have volunteered that this strain at the end of their lives was far the greatest they had encountered. One has only to picture the small woman nursing the large husband to realise something of what may be involved, and it would be unfair to the old people not to give full weight to this contribution they make to society.

Such strains are limited in duration either by their own nature or by the inability of the old person to keep up with them. By contrast, the strains put on the younger generation may last a very long time—it is not unusual for a daughter to care for an aged and ailing parent for twenty years. It is of some interest to discover how these strains are distributed among the younger generation. The 7·7% (fig. 7) comprised 28 daughters, 6 daughters-in-law, 2 nieces, and 1 friend, so that daughters are mainly concerned.

When one considers the type of life they are often forced to lead, one cannot avoid the conclusion that these younger people are working in a sweated industry and that they greatly deserve help from the rest of the community, help which at the moment they do not get. Their physical life is often handicapped by an inability to leave the house except for such necessities as shopping, and a further burden is the virtual impossibility of getting a holiday until the aged relation has died. When one meets such daughters who may have gone for months without being able to get out to the pictures, or others who may have gone for years without a break even for a day, the description of a sweated industry is justifiable. What is needed is some means whereby the old folk can be taken care of for a short time while the younger ones get a breather. There is urgent need for nursing-homes and other institutions capable of filling this particular gap.

* * *

It is hoped that this short description of some of the physical and social problems connected with old age may bring home the fact that this is a branch of medicine in which simple direct observation can still pay an ample dividend.

"... Today, wherever secondary education exists, there are four inter-related problems. . . . The first of these is how to free secondary education from the rigidity of a subject-bound curriculum . . .; the second is how to impart a higher social content to the curriculum; the third is how to pattern the time-table and motivate the young people once the rigid framework of a specialised examination course has given way to something more flexible; and the fourth, what is the best preliminary training to give those students who will be proceeding to universities or other places of higher education?"
—*Teach Them to Live*, by JAMES HEMMING. London, 1948.

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PNEUMONIC PLAGUE IN RANGOON

G. WYNNE-GRIFFITH
M.B. Lpool, D.P.H.
LATELY ASSISTANT DIRECTOR OF HYGIENE, BURMA COMMAND

PLAGUE has long been endemic in Burma, and Rangoon has been "infected" off and on for the last quarter of a century, the reservoirs being rats (*Rattus rattus*) and bandicoots (*Nesocia bengaliensis*). The pneumonic form, however, is rare. From time to time a terminal pneumonia in the course of a bubonic attack comes to notice; but never, so far as can be ascertained, have such cases given rise to a series such as the outbreak described here, at all events in Rangoon itself.

When it was recaptured in May, 1945, Rangoon was a severely devastated city. The work of rehabitation proceeded slowly and, even after eighteen months, scavenging, the disposal of refuse, and the removal of rubble and debris had made little impression on the general insanitary state of the city. Optimal conditions existed for the multiplication of rodents, and experienced observers were of the opinion that rats and bandicoots had never been so prevalent. Plague infection was confirmed among both species in 1945, but no sign of an epizoötic was found.

Human cases of bubonic plague in the city numbered 151 between May, 1945, and mid-August, 1946, with a peak incidence of 47 in March, 1946. From the middle of August until late September, 1946, the city was free from infection. The village where the present outbreak began had shared in the bubonic epidemic in the spring, 17 cases being reported up to early April. Since that time the village also had been free from the infection.

COURSE OF OUTBREAK

Pneumonic plague was not suspected until 10 persons had died, largely because the health authorities did not know the facts until a late date. Most of the cases were therefore diagnosed restrospectively. Nevertheless there is a strong presumption that these early cases were of the same nature as the later proved cases of plague.

The initial focus was the compound of a small soap factory in a village on the fringe of the city. In the factory and its compound lived several families, numbering 40–50 persons.

Cases 1, 2, and 3.—The village headman reported 3 deaths in this little community during the week ended Sept. 21, 1946, and gave the cause as fever. He knew the appearances of bubonic plague and had notified the cases which had occurred in the spring. When inquiries were made a fortnight later, the clinical details were meagre. There had been in each case a pyrexial illness of three or four days' duration and, in one case at least, bloody expectoration. Deaths from pneumonia are commonly ascribed to fever in the headmen's returns (Simmons et al. 1944). It is consonant with such facts as are known to regard these as the initial cases.

Case 4.—There was a further death in the compound on Sept. 22, the only clinical data available being fever and cough.

Case 5.—The husband of case 2, who also lived in the compound, was admitted to Rangoon General Hospital on Sept. 21. The hospital authorities were not told of the other deaths, and pneumonic plague was not suspected. The man was nursed in a general ward, and no particular precautions were taken. He died on Sept. 24. The hospital diagnosis was pneumonia.

Case 6.—A neighbour and friend of cases 2 and 5 was admitted to Insein General Hospital on Sept. 23. Again the hospital authorities were not told of the attendant circumstances, and plague was not suspected. This patient also was nursed in a general ward without special precautions, and he died on Sept. 25, the diagnosis being pneumonia.

Case 7.—The owner of the factory had been taken ill on Sept. 16. When, on the 22nd, there had been 4 deaths in the compound besides 2 seriously ill patients admitted to hospital, he decided to move with his family to his town house (house A), where he died on Sept. 26. In all, about 10 persons moved to house A, and of these a further 3 were to succumb.

Case 8.—The owner's wife was taken ill at house A on the day of her husband's death. On Sept. 30, while still sick, she moved to another area of the city (house B), where she died on Oct. 4. Her doctor certified death as due to pneumonia.

Case 9.—The mother of case 7 remained in house A, fell sick on Sept. 29, and died on Oct. 3. The cause of death was given by her doctor as malaria and bronchopneumonia.

Case 10.—The owner's brother-in-law lived in house C, two streets away from house A, but he was a frequent visitor at the sick-bed of case 7. He fell ill on Sept. 28 and died at house C on Oct. 3 of bronchopneumonia, according to his doctor.

Case 11.—Case 7 was responsible for a further series of cases, through the intermediary of a nurse who attended him at house A during his fatal illness. This nurse lived with 4 other nurses in house D, about a mile from houses A and C. She was ill on Sept. 30 but continued work. On Oct. 3 she visited her mother, who lived in a suburb (house E). The nurse stayed in this house for about five hours and was taken from there to the Rangoon General Hospital late in the evening of Oct. 3. She was immediately transferred to the fever hospital, where she died next day. Pneumonic plague was suspected on Oct. 4 and provisionally confirmed next day. During her short stay in house E she infected 3 persons.

Case 12.—An intimate friend of the nurse was in contact with her at house E on Oct. 3. He fell ill on Oct. 5 and lay in a neighbouring house (house F), whence he was transferred on Oct. 7 to the fever hospital, where he died next day. The diagnosis of pneumonic plague was confirmed bacteriologically.

Case 13.—A brother of case 11 lived at house F and was taken ill on Oct. 9 and admitted next day to the fever hospital, where he died on Oct. 12. The diagnosis was confirmed bacteriologically.

Case 14.—The sister of cases 11 and 13 lived in house G some two miles from house F but was in contact with cases 12 and 13. She fell ill on Oct. 10 at house G and was admitted that day to the fever hospital, where she died on Oct. 15. Full confirmation was forthcoming in her case.

Cases 15 and 16.—Two ward boys employed on menial duties in the block of the fever hospital where cases 11–14 had been isolated fell ill on Oct. 11 and were admitted as patients next day. One died on Oct. 12 and the other on Oct. 15. Both cases were confirmed bacteriologically.

The factory was situated in a congested little village of about 300 inhabitants. Houses A, C, D, and G were in the congested built-up areas of the city close to the waterfront. House B was a brick bungalow standing in its own grounds in a residential suburb. Houses E and F were bashas (bamboo huts) in a narrow lane of a dozen similar huts.

PREVENTIVE MEASURES TAKEN

The city health authorities first heard about the outbreak on Oct. 4, when pneumonic plague was suspected in case 11. When the course taken by the outbreak had been mapped, daily surveillance of known contacts was immediately instituted, and a daily house-to-house search for suspicious cases was made in the affected localities. These measures enabled cases 12, 13, and 14 to be isolated within twenty-four hours of onset. These searches were very thorough, and there is no reason to believe that any cases were missed. General hospitals and practitioners were warned to report any cases of suspicious illness. Plague inoculation was offered to the public at all infected areas, but the epidemic was over before this measure could have had any possible effect.

The organism was recovered from cultures of sputum as well as from guineapigs injected intramuscularly with sputum or inoculated through the intact skin of the abdomen.

INFECTIVITY OF PNEUMONIC PLAGUE

Hirst (1938) and Battaglia and Uriarte (1935) speak of pneumonic plague as being "extremely infectious"; but extreme infectiousness, such as that recorded by

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Hood (1925), is rare. Generally the disease is not particularly infectious. In the present outbreak the more or less intimate contacts of cases must have numbered over a hundred. Seven doctors examined and attended with impunity several patients with pneumonic plague though unaware that they were dealing with anything other than a straightforward pneumonia. A sick nurse attended an unknown number of her patients without once transmitting the disease. Four nurses slept three nights in the same small room as their sick colleague and escaped. A somewhat analogous instance is recounted by Gale (1941).

According to Clark and Goldberg (1943) 3 children slept in the same bed with a patient with pneumonic plague and yet escaped. Wu Lien-Teh et al. (1923) record how, on four occasions, about 160 persons were exposed to infection by travelling in crowded railway carriages with sick and dying patients with pneumonic plague without one of them contracting the disease. In the Suffolk outbreaks many close contacts were equally fortunate (Bulstrode 1911). In the outbreak described by Uriarte and Canal Feijóo (1935) a man was nursed during his fatal illness by his wife and daughter—"by the latter with less assiduity than the former." The daughter died, but the wife escaped. Townsend (1944) states that during an outbreak at Port Said 100 contacts were isolated: only 3 developed the disease. Wu Lien-Teh et al. (1936) collected numerous other instances, from both the literature and their own experience, of intimate contacts escaping infection.

Since it is generally agreed that natural immunity to pneumonic plague does not exist—that the infection is generally free to propagate itself in virgin soil—it is difficult to reconcile facts such as those recited above with any concept of a highly infectious disease.

DIFFUSIBILITY OF PNEUMONIC PLAGUE

That the power of diffusion exhibited by pneumonic plague is small, at all events in warm climates, has been noted by several writers. In such climates the disease appears to have difficulty in becoming established in epidemic form. Outbreaks are usually small—a score or two of cases—and not infrequently even confined to the first case or two. The present outbreak is an example. In Bengal pneumonic plague has been present on numerous occasions but has never spread to any considerable extent (Rao 1938). The same is true of Egypt (Petrie et al. 1923, cited by Wu Lien-Teh 1926), East Africa (Williams 1934, Plum 1942), and South Africa (Mitchell 1927, Gale 1941, Clark and Goldberg 1943). In the Argentine pneumonic plague has made its appearance on numerous occasions, but always the numbers involved have been small (Pardal 1935, Uriarte et al. 1935, 1936a and b). Among the reasons advanced for this feature of pneumonic plague are the temperature and humidity and the measures of prevention adopted.

Temperature and Humidity

Gill (1928) emphasises the importance of atmospheric factors which influence the plague bacillus during its short extracorporeal phase. High temperatures and low humidities reduce the diffusibility, and the reverse conditions, which prevailed in Manchuria, enhance the power of spread.

The meteorological data for Rangoon are given in the accompanying table.

METEOROLOGICAL DATA FOR RANGOON

1946	Temperature (F)*		Relative humidity (%)*		Rainfall (in.)
	Max.	Min.	11.30 A.M.	11.30 P.M.	
September	87·4	75·4	84·5	97·5	14·5
October	86·2	74·8	77·3	97·3	12·4

* Average of daily readings.

Wu Lien-Teh (1926) concludes that there is no adequate evidence of a direct effect of temperature and humidity, such as Gill (1928) has postulated. He says: "That the disease is less apt to spread in warm weather is explained . . . by certain extrinsic conditions like absence of overcrowding, &c." This last factor is also given prominence by Vint (1942) as explaining the poor diffusibility in Africa. In the present outbreak there was considerable overcrowding, particularly in houses A, C, D, E, and F, where the overcrowding might even be considered comparable to that of some of the Manchurian inns (Wu Lien-Teh 1913) but with the important difference that opportunities for ventilation were much greater in Rangoon.

Preventive Measures

It is widely held that preventive measures are of prime importance in limiting the spread of pneumonic plague (1911 Mukden Conference report cited by Wu Lien-Teh 1926). In South Africa the disease shows "great diffusive power," according to Mitchell (1927), who ascribed the Union's freedom from epidemics of any magnitude largely to the preventive measures adopted. Clark and Goldberg (1943) are also impressed by the efficacy of such measures.

Theoretically, pneumonic plague is easily controlled. The incubation period is relatively short; hence very few contacts will become cases after a week's quarantine. There is a distinct non-infectious phase lasting twenty-four to forty-eight hours after the onset of clinical illness—a phenomenon possibly unique among acute infectious diseases (Wu Lien-Teh et al. 1923). Immediate isolation during this phase of all cases of suspicious illness will effectively abort the outbreak (see Hood 1925).

In the present outbreak, when official action was taken on Oct. 5, there were ten localities implicated: the factory, the two general hospitals, houses A, B, C, D, E, and F, and the fever hospital. In six of these ten localities the disease had not spread. In two of the remaining four (the factory and house A) the infection had died out before official action had been taken regarding them. Though the early removal of patients from houses E, F, and G stopped the spread from these foci, the preventive measures were not entirely or even primarily responsible for the poor diffusibility.

Such experience is not exceptional. Thus in the epidemics described by Heggs (1924) preventive measures played little or no part in limiting the outbreaks. The same may be said of some of the villages affected in the epidemic described by Gale (1941). No official measures were instituted in the small Suffolk outbreaks (Bulstrode 1911). A recent account of a "self-limiting" outbreak is that of Pollitzer and Li (1943). Great store is placed on the value of preventive measures by Uriarte et al. (1935, 1936a and b). Nevertheless in some of the Argentine outbreaks several potential foci of infection do not become established, apart from any official intervention. In the outbreak at Frias in 1934, for example, 18 deaths took place in eight households. In at least three of these small foci official action was not responsible for their disappearance (Uriarte et al. 1936b).

I do not intend to imply that preventive measures are either ineffective or unnecessary. Of their efficacy there can be no doubt; and the need for them in every instance, if only as a form of insurance, is not questioned. I wish to emphasise that pneumonic plague in some circumstances appears to have a very low power of diffusion, and that the rôle of preventive measures in the control of this disease is not always paramount. This conclusion was reached by the greatest authority on the subject many years ago (Wu Lien-Teh 1926).

SUMMARY

A small outbreak of pneumonic plague in Rangoon is described. There were 16 deaths.

The infectivity of the individual patient is low. Theoretically the disease is easy to control.

The disease has a poor power of diffusion, and, unless the external circumstances are unduly favourable,

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tends to die out without or before preventive action is taken.

I wish to thank Dr. K. P. Pillai, acting health officer, Rangoon; Dr. J. A. Anklesaria, port health officer, Rangoon; and Mr. K. Unsworth, of the Liverpool School of Tropical Medicine, for much information and other assistance.

REFERENCES

Battaglia, M. I., Uriarte, L. (1935) *Rev. Inst. bact., B. Aires*, 6, 661.
Bulstrode, H. T. (1911) *Rep. loc. Govt Bd publ. Hlth*, no. 52.
Clark, B. M., Goldberg, S. (1943) *S. Afr. med. J.* 17, 57.
Gale, G. W. (1941) *Ibid*, 15, 369.
Gill, C. A. (1928) The Genesis of Epidemics and the Natural History of Disease. London.
Heggs, T. B. (1924) *Trans. R. Soc. trop. Med. Hyg.* 18, 45.
Hirst, L. F. (1938) British Encyclopædia of Medical Practice. London; vol. IX, p. 675.
Hood, A. (1935) *Jour. R. Army med. Cps*, 44, 459.
Mitchell, J. A. (1927) *Publ. S. Afr. Inst. med. Res.* 3, 89.
Pardal, E. (1935) *Rev. Inst. bact., B. Aires*, 6, 643.
Plum, D. (1942) *E. Afr. med. J.* 19, 3.
Pollitzer, R., Li, C. C. (1943) *J. infect. Dis.* 72, 160.
Rao, S. R. (1938) *Indian med. Gaz.* 73, 671.
Simmons, J. S., et al. (1944) Global Epidemiology. London.
Townsend, S. L. (1944) *J. R. nav. med. Serv.* 30, 25.
Uriarte, L., Argerich, R., Passalacqua, R. (1935) *Rev. Inst. bact., B. Aires*, 6, 651.
— Canal Feijóo, E. J. (1935) *Ibid*, 7, 42.
— Morales Villazón, N., Anchezar, B. (1936a) *Ibid*, 7, 705.
— — Crescentino, H., Anchezar, B. (1936b) *Ibid*, p. 549.
Vint, F. W. (1942) *E. Afr. med. J.* 19, 9.
Williams, A. W. (1934) *Ibid*, 11, 229.
Wu Lien-Teh (1913) *J. trop. Med. Hyg.* 16, 275.
— (1926) A Treatise on Pneumonic Plague. Geneva.
— et al. (1923) *J. Hyg., Camb.* 21, 298.
— Chun, J. W. H., Pollitzer, R., Wu, C. Y. (1936) Plague. Shanghai.

TREATMENT OF TUBERCULOUS MENINGITIS WITH STREPTOMYCIN

A REPORT TO THE MEDICAL RESEARCH COUNCIL

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SINCE November, 1946, we have treated 18 cases of tuberculous meningitis with streptomycin. In 14 the diagnosis was confirmed by culturing *M. tuberculosis* from the cerebrospinal fluid (C.S.F.); in 1 confirmation was only obtained post mortem; in 1 acid-fast bacilli were seen on films though cultures and guineapig inoculation were negative; in the remaining 2 cases, both of which have recovered, the diagnosis was not confirmed. The last 4 cases have been included in this report because of the bearing they have on the important questions of diagnosis and management.

The results to date are as follows (see table): Of the 18 cases, 7 have proved fatal, the illness being prolonged in all but 2. Of the 11 survivors, 7 were treated with streptomycin for 68–255 days and are now virtually free from symptoms, one to six months after their treatment ended. The 4 other survivors are still under treatment, which was begun over two months ago.

All more recent cases are excluded from this report, as are 3 cases in which, for various reasons, treatment was given for less than a week. One of these will be referred to in the discussion on diagnosis.

ILLUSTRATIVE CASES

Intense Infection not Controlled by Streptomycin

Case 1.—A woman, aged 24. At the 6th month of her second pregnancy she complained of abdominal pain followed a week later by intense headache and vomiting and right hemiparesis. Treatment was begun during the second week of symptoms at which time she was in coma, showed meningism, ocular paresis, bursts of coarse nystagmus, a mild hemiplegia, and signs of fibrocaseous tuberculosis in the apex of each lung (*M. tuberculosis* recovered on gastric lavage). Lumbar C.S.F.: initial pressure 300+ mm. water, white cells 127 per c.mm. (88% lymphocytes), protein 160 mg. per 100 ml., chlorides 610 mg. per 100 ml., sugar greatly diminished, *M. tuberculosis* on films, cultures, and guineapig inoculation.

She was given streptomycin, 1 g. intramuscularly and 0·1 g. intrathecally each day, and was fed by stomach-tube. During the first fortnight there was slow but steady improvement, and on the 12th day Prof. Chassar Moir emptied the uterus by modified lower-segment cæsarean section. Streptomycin was found in the amniotic fluid and in the blood of the fœtus, thus confirming American observations.

As she regained consciousness the patient was found to be severely demented, with visual and auditory hallucinations, and this state persisted until her death four months after the start of treatment. *M. tuberculosis* was found in the C.S.F. up to the time of death: of 141 samples of C.S.F. cultured during the course of the illness 32 were positive.

Necropsy showed intense fibrocaseous infiltration of the leptomeninges, in which were scattered tubercle bacilli; endarteritis and periarteritis of the meningeal vessels of the brain and spinal cord, with some areas of infarction or cyst formation of the underlying brain; and fibrocaseous tuberculosis of both lungs.

In this and 4 other fatal cases life was undoubtedly prolonged by streptomycin, by contrast with the other 2 fatal cases in which life was not prolonged. All fatal cases had active tuberculous lesions elsewhere in the body. In 2 of them a severe external hydrocephalus due to obstruction of the cisterna ambiens by tuberculous granulation tissue dominated the final stages of the illness. In 2 others technical errors of treatment, resulting in pyogenic infection in one and severe intracranial hæmorrhage from repeated ventricular needling in the other, also contributed to death.

Tuberculous Meningitis Controlled by Streptomycin

Case 2.—A girl, aged 19, came under our care on Nov. 27, 1946, as a case of "? tuberculoma, ? abscess of the brain." There was a past history of otitis media. In August, 1946, she developed a left-sided pleural effusion, the fluid from which was negative on guineapig inoculation. She was discharged to her home in September, 1946, with a normal sedimentation-rate (1 mm./hour Westergren), and though the sedimentation-rate rose to 38 mm./hour she remained well apart from persistent amenorrhœa. On Nov. 15, without warning, she had a major epileptic fit and from that time developed headaches, vomiting, and drowsiness. On Nov. 19 her lumbar C.S.F. was still normal (pressure 155 mm. water, 3 lymphocytes per c.mm., protein 20 mg. per 100 ml., chlorides 730 mg. per 100 ml.), but on the 25th a mild right hemiparesis was evident.

On admission to the Radcliffe Infirmary she was drowsy, confused, and photophobic, with slight neck stiffness and early bilateral papillœdema, a mild right hemiparesis, and bilateral extensor plantar reflexes. Ventriculography showed slight symmetrical dilatation of the ventricles, a finding which excluded brain abscess or other expanding lesion. Ventricular C.S.F. (Nov. 28): 36 lymphocytes per c.mm., protein 40 mg. per 100 ml., chlorides 700 mg. per 100 ml., no *M. tuberculosis* on films. Lumbar C.S.F. (Nov. 29): 88 white cells per c.mm. (mostly lymphocytes), protein 30 mg. per 100 ml., chlorides 690 mg. per 100 ml., normal sugar, *M. tuberculosis* not seen on films but later grown on culture and proved positive on guineapig inoculation. The findings are charted in fig. 1. Radiography of chest showed only some left-sided pleural thickening.

In spite of the negative films of the C.S.F. the evidence was strongly in favour of early tuberculous meningitis, and accordingly streptomycin treatment was begun on the 16th day of the illness before the diagnosis was verified. Eleven days later *M. tuberculosis* was found in films and subsequently several positive cultures were obtained. Owing to shortage of supplies streptomycin was given by the intrathecal route alone for the first three and a half months (0·1 g. daily), followed by a three months' course of intramuscular streptomycin (2 g. daily).

During the first six weeks of treatment her temperature gradually fell to normal but for three months she remained drowsy, confused, extremely slow in response, and incontinent of urine—a picture of mild but on the whole decreasing dementia. When she went to a sanatorium on May 16, 1947, she was 40 lb. below her normal weight. As soon as intramuscular streptomycin was stopped on June 17, 1947, she

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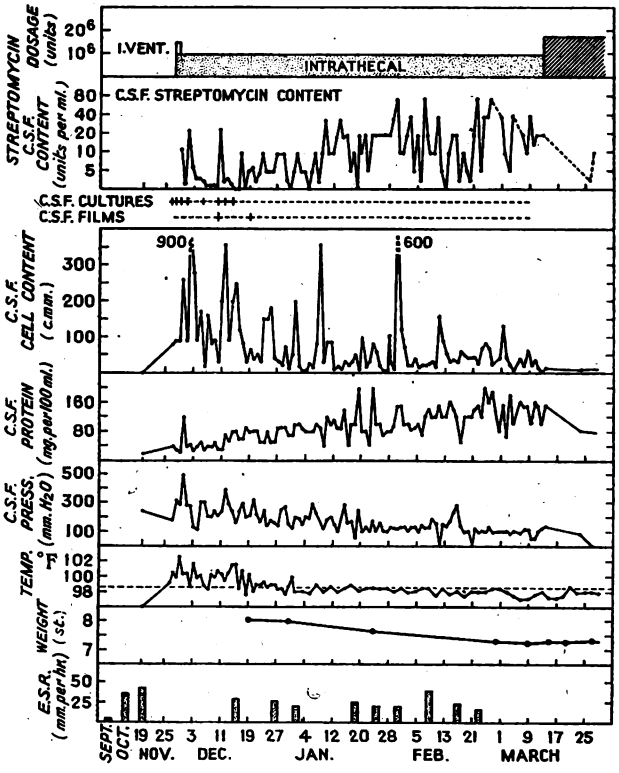

Fig. 1 (case 2)—Temperature, C.S.F. changes and streptomycin content, and treatment together with the weight and sedimentation-rate curves during the first three months of treatment.

regained her appetite, and when discharged on Oct. 18 she weighed 118 lb., a gain of 21 lb. in four months, and she was still gaining. By then she was free from symptoms, and the only physical signs were slight high-tone deafness and absence of any response to caloric tests. Psychometric examination showed no indications of mental deterioration. Menstrual periods began in May, 1947, after a gap of seven months and were thereafter regular. Her lumbar C.S.F. became normal ten months after the onset of illness (no cells, protein 30 mg. per 100 ml., chlorides 740 mg. per 100 ml., sugar normal; films, cultures, and guineapig inoculation negative), the last thing to become normal being the protein.

The result to date in this case exceeded our expectations. The tuberculous infection of the meninges appeared to be controlled fairly promptly and the patient never developed spinal block or symptoms of hydrocephalus, but the organic dementia persisted for so long that at one time full functional recovery seemed unlikely. At the end of a 213-day course of streptomycin treatment she was very weak and wasted, childish, vain, and mentally slow. Thereafter physical and mental recovery was rapid and complete though it is still too early to be sure that it is permanent.

The results in the other 6 survivors who have stopped treatment have been similarly satisfactory to date.

Unverified Cases

Case 16.—A boy, aged 11 months. On April 11, 1947, he was admitted to hospital elsewhere with bronchopneumonia. He recovered on sulphonamides and penicillin, though his temperature did not entirely settle, but routine tests showed a strongly positive Mantoux reaction, and on further inquiries it was found that the child's father was suffering from open pulmonary tuberculosis. An X-ray film taken at this time showed a considerable shadow in the right lung field which was thought to be tuberculous.

On May 11 the infant went off his food; he began to vomit and lose weight, and his temperature rose. As no further changes were found in the chest a lumbar puncture was done to exclude early tuberculous meningitis, with the following findings: pressure normal, white cells 50 per c.mm. (polymorphs and lymphocytes in equal proportions), protein 40 mg. per 100 ml., chlorides 620 mg. per 100 ml., no *M. tuberculosis* on films, cultures for pyogenic organisms sterile.

He was admitted to the Radcliffe Infirmary on May 17. He was pale, apathetic, and his neck was slightly stiff. Apart from signs of generalised bronchitis there was no abnormality in the chest; radiography confirmed the previous findings. E.S.R. 28 mm./1 hour (Westergren). Lumbar C.S.F.: 130 cells per c.mm. (95% lymphocytes), protein 20 mg. per 100 ml., chlorides 660 mg. per 100 ml., films and cultures for *M. tuberculosis* negative. Unfortunately no guineapigs were available for inoculation. Ventricular estimation showed that both lateral ventricles were normal in size and position. Mantoux reaction was strongly positive at 1/10,000 dilution.

The child was regarded as an early case of tuberculous meningitis and was given a course of intramuscular (68 days) and intrathecal (30 days) streptomycin. Towards the end of the second week of treatment he stopped vomiting, became more alert, and began rapidly to gain weight. On June 16 he had three fits and intrathecal treatment was stopped. A month later his C.S.F. was completely normal. Systemic streptomycin treatment was stopped on July 25. His Mantoux test remained positive, but cultures of 40 samples of lumbar or ventricular C.S.F. were all negative. At the last report on Dec. 1, 1947, the infant was in all respects normal except that his chest radiogram was unchanged.

In view of the history of exposure, the radiogram of the lungs, the clinical picture, the positive Mantoux test, the C.S.F. findings, and the course of the disease under treatment, we regard this as an early case of tuberculous meningitis.

These last 2 cases illustrate the dilemma in which, while *M. tuberculosis* is being sought, the uncertainty of diagnosis must be balanced against the risk of allowing the disease to progress untreated to a stage from which complete recovery is impossible. In both it was decided to obviate this risk by beginning treatment immediately in the hope that the results of cultures would confirm the diagnosis—a hope that was realised in the first but not in the second case.

DOSAGE AND SPREAD

In most of our cases we have given streptomycin by the intramuscular and intrathecal routes for at least the first six weeks of treatment and thereafter by the intramuscular route alone for the next four to six months.

Systemic.—In all but our earliest cases the dosage adopted was for adults 2 g. daily, and for infants 0·02 g. per lb. of body-weight daily, at first by divided doses and then by a single daily dose. After about four months, if the patient is doing well, a single injection of 2 g. is given every 48 hours if this produces an adequate level of streptomycin in the C.S.F.

Intrathecal.—A single daily injection is given into the lumbar subarachnoid space or into the anterior horn of the lateral ventricle; for adults 0·1 g., for infants 0·05-0·075 g. Occasionally the streptomycin was also injected into the subarachnoid space in the region of the optic chiasm (q.v.).

Higher levels could be maintained in the C.S.F. by injecting streptomycin directly into the theca. For example, case 12, a boy of 14 years, was first treated with intramuscular streptomycin only (2 g. daily); after three months this was supplemented by a daily lumbar injection of 0·075 g. The average value of the first 20 estimations of streptomycin in the C.S.F. 24 hours after injection was 5·7 μg./ml., compared with an average of 20·5 μg./ml., when both intramuscular and intrathecal injections were given.

There is good evidence that, like penicillin, streptomycin can, in the absence of spinal block, pass freely from lumbar sac to ventricle and vice versa. Fig. 2 illustrates the passage of streptomycin from lumbar sac to ventricle.

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RESULTS OF TREATMENT OF TUBERCULOUS MENINGITIS WITH STREPTOMYCIN

Case no.	Age (yr.)	Sex	Duration of symptoms when treatment began (days)	Clinical condition when treatment began	Diagnostic proof	Tuberculous lesions elsewhere	Streptomycin: Intramuso. Days	Streptomycin: Intramuso. g.	Streptomycin: Intrathecal Days	Streptomycin: Intrathecal g.	Total days of treatment	Persistence of *M. tuberc.* in C.S.F. (days after streptomycin began): Film	Persistence of *M. tuberc.* in C.S.F. (days after streptomycin began): Culture	Results	Days of observation
1	24	F	12	Stuporous, demented, mild hemiplegia	F., C., G.P., P.M.	Fibrocaseous pulmonary tubercle. (X-ray and P.M.)	130	130	(1) 19 (2) 61 (3) 5	1·85 7·3 0·5	130	131 (i.e., till death)	131	Died. Life prolonged	131
2	19	F	13	Drowsy, confused, mild hemiplegia, early papilloedema	F., C., G.P.	Pleural effusion 3 months before meningitis	110	220	103	10·24	113	21	16	Survived. Satisfactory	365
3	20	M	114 (G.S.) 3 (N.S.)	Comatose and demented	F., C., G.P., P.M.	Miliary (X-ray and P.M.). Tb sacro-iliac arthritis (P.M.). Tb otitis (P.M.)	8½	27	8½	2·3	8½	8 (i.e., till death)	8	Died. Life not prolonged	8½
4	22	M	42	Drowsy, meningism, minimal left-sided weakness	F., C., G.P.	Probable miliary (X-ray)	255	510	140	13·63	255	21	27	Survived.‡ Satisfactory	270
5	20	M	*c.* 15	Pyrexia and meningism only, alert and rational	F., C., P.M.	Pleural effusion 7 months and tb arthritis (knee) 6 months before meningitis. Miliary tb spleen. Fibrocaseous tb peritonitis. Tuberculoma of dura (P.M.)	49	98	59	6·875	60	9	22	Died.* Life prolonged	59
6	19	M	*c.* 35	Confused, hemiplegia and hemianopia	F., C., P.M.	Caseating mediastinal glands. Few caseous foci lungs, spleen, and liver (P.M.)	25	50	34	3·7	34	5	17	Died.† Life prolonged	42
7	4	M	12	Slight fever and meningism only	F., C.	Calcified hilar glands	(1) 25 (2) 177	25 127	67	4·375	222	10	25	Survived. Satisfactory	230
8	18	M	11	Drowsy, slightly confused, emotionally unstable	C.	None detected	189	378	(1) 5 (2) 55	0·5 5·4	194	Never found	0	Survived.‡ Satisfactory	214
9	19	M	21	Coma, hemiplegia	F., C., P.M.	None (X-ray). P.M. fibrocaseous pulm. and mediastinal tb. Miliary of liver and spleen	..	..	10	1·0	12	9	10	Died. Life not prolonged	12
10	2	M	7	Status epilepticus	P.M.	Caseous tb peritoneum	..	..	41	2·6	41	..	..	Died. Life prolonged	157
11	16	F	*c.* 60	Confused	F., C., G.P.	Miliary (X-ray)	(1) 113 (2) 6+	226 12	(1) 12 (2) 6+	0·85 0·5	119+	8	29	Survived‡	143
12	14	M	10	Fever, headache and meningism only. Recent ? epileptic ? acute hydrocephalic attack	F., C.	Pleural effusion 5 months, haemoptysis 3 months before meningitis	127+	254	40+	3·0	130+	54	1	Survived.‡ Satisfactory	130
13	24	F	56	Comatose and hemiplegic, mute	F., C., G.P., P.M.	Miliary (X-ray and P.M.)	80	160	..	..	80	82 (i.e., till death)	82	Died. Life prolonged	82
14	1	M	10	Slight fever, meningism and irritability only	F., C.	None detected	106+	37·5	35	1·75	106+	0	0	Survived.‡ Satisfactory	106
15	7	M	*c.* 35	Restless, coma, mild hemiplegia, recent ? epileptic ? acute hydrocephalic attack	C.	Pulmonary consolidation (X-ray)	55+	55	(1) 8 (2) 24+	0·5 0·8	55+	Never found	0	Survived.‡ Satisfactory	55
						UNVERIFIED									
16	11/12	M	37 (R.S.)	Fever, meningism and vomiting only	..	Primary lung complex	68	20·4	30	1·625	68	..	..	Survived. Satisfactory	195
17	11	M	21	Meningism and severe headache	..	Small calcified foci in lungs (X-ray)	..	..	57	2·875	57	..	..	Survived. Satisfactory	150
18	22	M	30	No abnormal signs, recent meningitis	F.	Cervical adenitis	120	240	..	..	120	..	..	Survived. Satisfactory	150

G.S. = general symptoms; N.S. = neurological symptoms; R.S. = respiratory symptoms; F. = *M. tuberculosis* identified on films; C. = *M. tuberculosis* grown on culture; G.P. = guineapig inoculation positive; P.M. = diagnosis confirmed at necropsy.
Plus sign following days of treatment indicates that patient is still receiving streptomycin.
* Death precipitated by haemorrhage; † death precipitated by cerebral abscess; ‡ still under treatment Dec. 5–8, 1947.

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SIDE-EFFECTS

Pleocytosis in C.S.F.

In many of our cases the cell and protein content of the C.S.F. has risen during the first week of intrathecal injections of streptomycin. This rise was, however, not invariable, nor was there any constant time-relation between the increase in cell-count and the first injection of streptomycin; it is therefore difficult to ascribe the rise to irritation of the meninges by streptomycin. This conclusion is supported by post-mortem evidence. For example, in case 6, the meninges covering the cauda equina appeared normal, though the patient had received a daily lumbar injection of 0·1 g. for 35 consecutive days. Other possible explanations of the pleocytosis are low-grade secondary infections, often from contamination of the saline used for solutions (Jepson and Whitty 1946), or blood in the subarachnoid space resulting from the trauma of the puncture.

Other Effects of Intrathecal Injection

Clinically we have seen no reactions following lumbar injection of streptomycin in the present series. This is in striking contrast with earlier experience when using very impure preparations of streptomycin (Cairns et al. 1946). Usually the injections are painless, though after many have been given they may cause root pain, especially when the lower intervertebral spaces have been used. One infant of 11 months (case 16) had three fits in rapid succession while receiving daily lumbar injections of streptomycin 0·05 g., but whether these were directly related to his treatment is not known; there have been no other fits related to streptomycin therapy in this series. In case 9 ventricular injections were sometimes followed by flushing of the face, sweating, and, a few hours later, a period of drowsiness resembling deep natural sleep; similar periods of sleepiness were seen in case 11, but no other reactions to ventricular injections were detected. In a small number of observations, made on 2 infants and an adult, no reactions were observed after twice daily injections of streptomycin 0·006 g. in 6 ml. of normal saline into the region of the cisterna chiasmatica.

Precautions

Thus, using modern preparations in the dose described, the intrathecal administration of streptomycin has proved safe even when continued for as long as 140 consecutive days (case 4), provided the strictest aseptic precautions are taken. How essential these precautions are is shown by case 6, in which an infected burr-hole resulted in subdural and cerebral abscess and death. From experience gained in treating a large series of pyogenic infections with intrathecal penicillin, we consider the following precautions obligatory.

(1) All instruments are sterilised by autoclaving. Since this may injure the metal fittings on syringes, all-glass syringes are used.

(2) The operator wears a mask, does not "scrub-up" surgically, but uses a strict "no-touch" technique.

(3) Two agents are used for cleansing the skin—'Cetavlon' and perchloride of mercury—and no dressing is applied after lumbar puncture since this tends to produce a dermatitis.

(4) The quantities of streptomycin solution required for single injections are put in separate containers so that each container is used once only.

(5) All solutions for intrathecal use are sterilised by Seitz filtration.

Use of the ventricular route necessarily carries with it some risk of hæmorrhage, but there is also risk of both hæmorrhage and infection when a long course of daily lumbar injections is undertaken, and injection technique for repeated puncture is very important since blood in the subarachnoid space causes pyrexia and increased meningism, while local trauma or dermatitis may render lumbar puncture impracticable. The difficulties involved can be overcome by an experienced operator using fine needles.

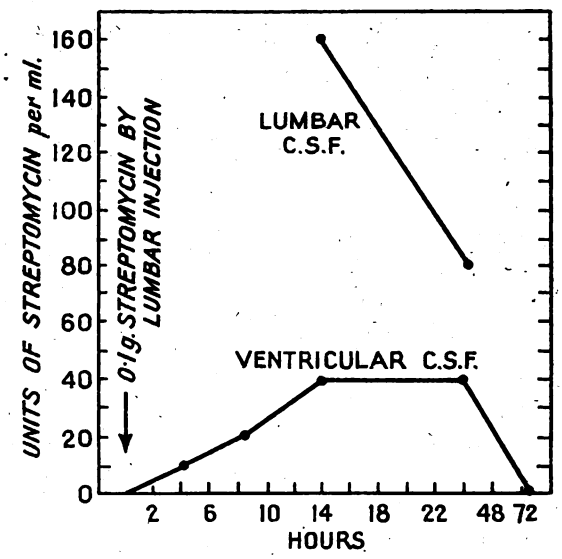

Fig. 2—Levels of streptomycin in the ventricular and lumbar C.S.F. after a single lumbar injection of 0·1 g. streptomycin. Non-meningitic case.

Effects on Eighth Nerve

All our surviving patients who were old enough to allow the requisite tests to be made have shown absent caloric responses (in case 2 the caloric responses had returned when the patient was re-examined seven months after finishing her treatment) and moderate high-tone deafness, only detectable by audiometry, by the time their treatment was concluded. In addition, case 11 developed a severe global deafness after four months of treatment, and case 7 developed a mild ataxia from which he ultimately recovered.

Gastric Upsets

More troublesome than the effects of the drug on the eighth nerve have been persistent anorexia and vomiting with consequent failure to gain weight. This has been seen in 6 cases, and is sometimes severe enough to constitute a major problem in management. We have not been able to control the vomiting with 'Benadryl' or gastric astringents or by gastric lavage, and though it usually decreased as the infection subsided it seldom ceased altogether until streptomycin was withheld.

PATHOLOGY

Our pathological investigations are not yet complete, but it is not possible to discuss the clinical problems without some consideration of the changes found post mortem in treated cases.

In the 5 fatal cases in which the illness was prolonged to 42–157 days by treatment the most intense tuberculous changes are found in the cisterna ambiens, the interpeduncular space, and the proximal part of the Sylvian fissures. Here exudate is always intense, even when little or none is seen in the cisterna magna or spinal subarachnoid space. Fibrous and caseous tubercles up to 0·5 cm. in diameter are numerous on the arteries of the circle of Willis and extend up to the Sylvian fissures. These arteries are usually also embedded in exudate and one or other of them is sometimes thrombosed (fig. 3). In none of our cases have we seen tuberculomas in the brain.

These changes lead to several groups of clinical events: (1) communicating hydrocephalus; (2) symptoms of cerebral anoxia or infarction, of which hemiplegia is the most easily recognised; and (3) symptoms of hypothalamic disturbance. Though we have seen unmistakable gross examples of each of these lesions, it is not always easy to distinguish the cause of individual

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symptoms; drowsiness, for example, may be due to hydrocephalus, or to cerebral infarction, or to involvement of the floor of the third ventricle in exudate. For that matter, it may also be a complication of treatment, either following injection of streptomycin or from low intracranial pressure caused by repeated withdrawal of C.S.F.

Communicating Hydrocephalus

Communicating hydrocephalus is due to obstruction at the cisternæ ambiens and interpeduncularis which constitute a bottle-neck in the cerebrospinal pathways at the level of the tentorial opening. Cerebrospinal fluid can pass freely from the ventricle into the cisterns and subarachnoid spaces of the hind-brain and spinal cord but cannot pass upwards over the cerebral hemisphere to be absorbed (fig. 4). A varying degree of obstruction at the tentorial opening probably exists at some stage in all cases, surviving as well as fatal. This may not give rise to obvious symptoms of hydrocephalus unless the exudate is intense or some additional mechanism, such as upward displacement of the cerebellar vermis into the tentorial opening, renders it complete. Unless there is a concomitant spinal block, the ventricular and lumbar C.S.F. pressures are equal and high, and streptomycin or irrigating fluids like Hartmann's solution pass freely from the lateral ventricle to the lumbar subarachnoid space, and vice versa.

Direct evidence of obstruction at the tentorial opening has been provided by air injection in several of our cases; during the active stage of the disease we have invariably found a bubble of air held up in the cisterna interpeduncularis, sometimes for days, but have never seen air in the sulci of the cerebral hemispheres (figs. 5 and 6). An air-lock of this type does not necessarily mean that there is an absolute obstruction to the passage of C.S.F. and streptomycin, and indeed in most cases the obstruction must remain relatively slight, otherwise the symptoms of hydrocephalus—intense rise of intracranial pressure, papill-œdema, and gross dilatation of the ventricular system—would inevitably supervene. Two of our fatal cases showed gross communicating hydrocephalus (fig. 6) with symptoms of decerebrate rigidity before death, and case 4, a survivor in whom the functional recovery has been excellent, had a sudden acute hydrocephalic attack at one stage of his illness.

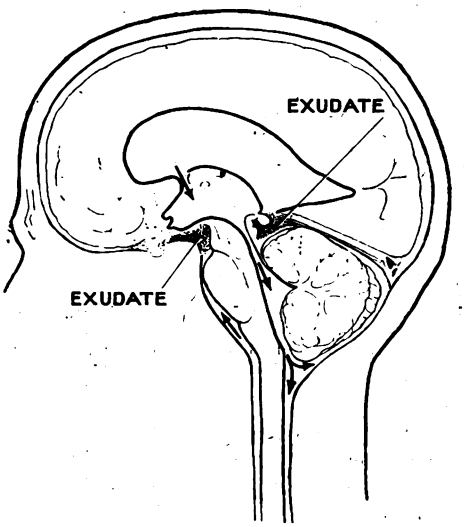

Fig. 4—Diagram to show the obstruction by exudate of C.S.F. at the cisterns of the incisura tentorii. Communicating hydrocephalus. Sagittal section of brain, slightly off centre.

Case 4.—Two months after treatment was begun this patient complained of frontal headaches, his spinal pressure, which had varied between 150 and 250 mm., became consistently over 300 mm., and he developed obvious papill-œdema. After four days his headache grew worse, he had a projectile vomit, and he became so drowsy that he could not be roused. His symptoms were not improved by 50% glucose intravenously but were promptly relieved by withdrawal of C.S.F. from the lateral ventricles until the pressure became atmospheric. This was the only episode of the kind which this patient had and subsequently his C.S.F. pressure reverted to the previous levels of 150–250 mm. Though there was increase of neck-stiffness during the attack there was no increase of meningitis as judged by daily examination of the C.S.F., but there was a rise of blood-pressure.

From necropsy studies in fatal cases it seems probable that this type of hydrocephalic episode is due to plugging of the tentorial opening by upward displacement of the vermis. If unrelieved the condition may become progressively worse and prove fatal.

Some degree of dilatation of the ventricles probably took place in almost all cases, even in those in which mental and physical recovery was complete (fig. 7).

Arterial Obstruction

The vascular changes in untreated tuberculous meningitis were described by Smith and Daniel (1947). The treated series show old shrunken cerebral infarcts where in the untreated series recent infarcts were found. Some degree of hemiplegia, usually of the faciobrachial type, has been common. It is evidently usually due to obstruction of smaller vessels, for of 6 cases studied by carotid arteriography there were only 2 in which obstruction to one of the main cerebral arteries was demonstrated (fig. 8).

Hypothalamic Symptoms

At various stages of the illness our adult patients have had disturbances of sleep rhythm, glycosuria, arterial hypertension, and bulimia, also attacks of uncontrollable

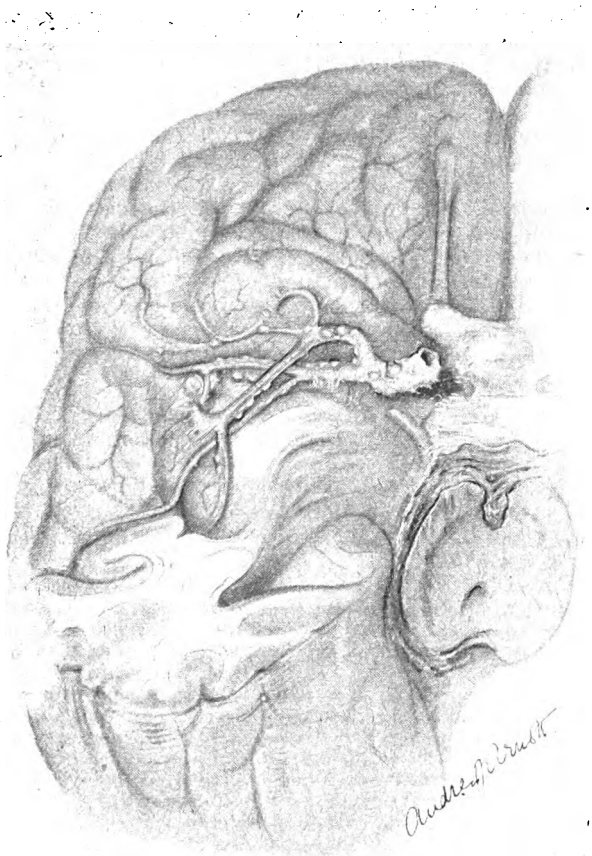

Fig. 3—Drawing of a dissection of the brain in case 6 to show the circle of Willis and the vessels of the right Sylvian fissure. These vessels are studded with tubercles and before dissection were embedded in the dense exudate filling the cisterna chiasmatica and spreading into the Sylvian and longitudinal fissures. Note the thickness of the exudate covering the front of the pons and cut through when the brain stem was divided.

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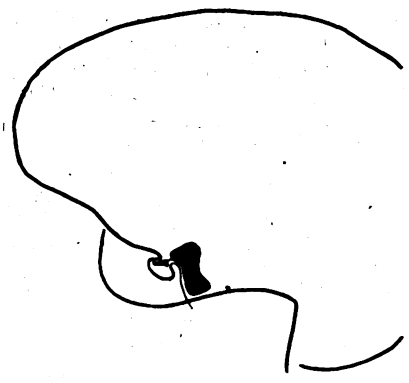

Fig. 5

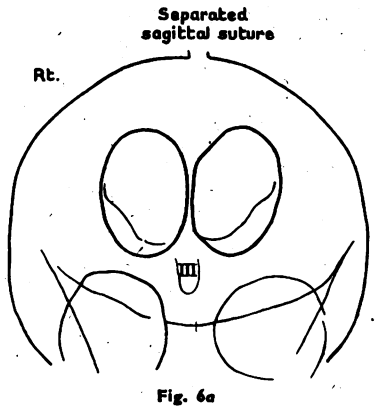

Fig. 6a

Fig. 6b

Fig. 5 (case 4)—Bubble (black) of air held up in the cisternæ chiasmatica and interpeduncularis after injection into the spinal subarachnoid space.

Fig. 6a and b (case 10)—Ventriculographic tracings showing gross communicating hydrocephalus. When 50 c.cm. of air was injected into one lateral ventricle it escaped into the basal cisterns but failed to reach the subarachnoid space of the cerebral hemispheres owing to obstruction at the cisterns of the incisura tentorii. Bubbles of air (black) are seen in the cisternæ interpeduncularis, cerebello-pontis, and magna.

terror reminiscent of delirium tremens. Korsakow's syndrome was also seen twice. We have not seen any of these symptoms in the 6 children of the series.

Spinal Block

Spinal block has occurred in 4 of our 16 cases, and was shown by fall of lumbar spinal pressure, poor flow of lumbar C.S.F., rise in its protein content to 1000 mg. per 100 ml. or more, and sometimes by a poor response of spinal pressure on compression of the jugular veins. These blocks do not appear to be such an urgent problem in the treatment of tuberculous as in that of pyogenic meningitis, for streptomycin passes from blood to C.S.F. much better than penicillin. However, they do indicate widespread disease in the spinal meninges and 3 of our 4 cases have died and the fourth is not doing well at the time of writing.

In one fatal case (case 1) the block only persisted for about a week and subsequent irrigation of the lateral ventricles with Hartmann's solution while a lumbar puncture needle was in situ showed a free communication. This patient died a week later and at necropsy was found to have a massive tuberculous exudate throughout most of the dorsal aspect of the spinal cord, but on the ventral aspect the subarachnoid space was relatively clear of exudate and obviously patent. This selective distribution of the exudate may be the result of dorsal decubitus.

DIAGNOSIS

Clinical

The clinical aspects of tuberculous meningitis are well known and certain variants have been described in a previous paper (Smith and Daniel 1947). However, in individual cases *early* diagnosis may present considerable difficulties. Only 8 of our 18 cases were sent into hospital with a presumptive diagnosis of tuberculous meningitis. Two of the children were diagnosed as acute abdominal emergencies and 1 of these had his appendix removed, while in the adults the presumptive diagnoses included cerebral abscess, cerebral tuberculoma, lymphocytic meningitis, pyelitis, and neurosis. In the past cases have been sent to hospital as cerebral tumour, head injury, and subarachnoid hæmorrhage. On the reverse side of the problem, which is becoming more evident now that streptomycin is available, cases of poliomyelitis, Weil's disease, cerebral abscess, cerebral tumour, and salicylate poisoning have been submitted as cases of tuberculous meningitis.

Bacteriological

Every specimen of C.S.F. was examined by films and cultures and assayed for streptomycin content, in addition to the routine cytological and chemical examination.

A tentative diagnosis of tuberculous meningitis may be made by finding acid-fast bacilli of typical morphology in the C.S.F. The occurrence of similar organisms in subsequent specimens makes the diagnosis more certain, but in all cases confirmation of the microscopic findings should be obtained by culture or guineapig inoculation. The possibility of contamination of occasional specimens with saprophytic acid-fast organisms, dead or alive, is well known to bacteriologists, and microscopic examination alone should not be relied on.

There is no difficulty about the obvious case with plenty of tubercle bacilli in the C.S.F. There are, however, a considerable number of cases in which the diagnosis cannot be immediately proved. In 7 of our 18 cases treatment was begun before organisms were identified in the C.S.F.; in 3 of these cases no bacteriological confirmation has ever been obtained (unfortunately none had guineapig tests), though in 1 the diagnosis was confirmed at necropsy. In 2 others it was first obtained from subsequent films of the C.S.F. and later confirmed by cultures; and in yet another 2 it was only obtained by cultures. The difficulty in obtaining bacteriological confirmation of the diagnosis would be lessened if all samples of C.S.F. were saved and sent with the patient, together with any films or cultures set up at the time of transfer to a streptomycin centre.

Atypical Cases

The difficulty in diagnosis is increased by the fact that now we are engaged in a special study of tuberculous meningitis we are seeing cases in which neither the clinical nor the bacteriological findings are typical. The following case (not included in the present series) illustrates some of the difficulties we are now encountering.

A girl of 12 years was admitted to an isolation hospital on Oct. 5, 1947, as a case of poliomyelitis. For the previous eight days she had had a cold and the day before admission she began to complain of headache with pain and stiffness in her back and neck. On admission the temperature was 100°F, her neck was a little stiff, but no other physical signs could be found. Lumbar puncture was performed, the child was kept in bed, and no chemotherapy was given. During the next 24 hours the headache subsided, the temperature settled, and except that she vomited once on her fourth day in hospital she seemed perfectly well. When, however, the C.S.F. was reported on it was found to contain 46 white cells per c.mm., protein 42 mg. per 100 ml., and chlorides 550 mg. per 100 ml., while acid-fast bacilli were seen on the films. Lumbar puncture was repeated a fortnight later, when the C.S.F. was essentially unaltered and acid-fast bacilli were again seen on the films. On Oct. 16 the child was transferred to us.

On admission she seemed perfectly well, X-ray films of the chest and skull were normal, and the Mantoux test was

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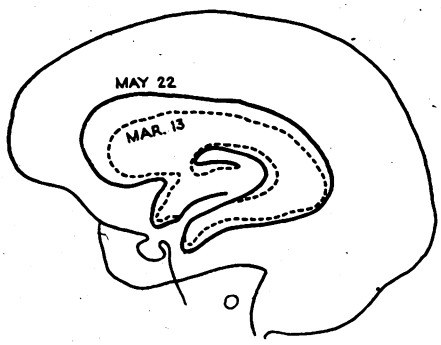

Fig. 7

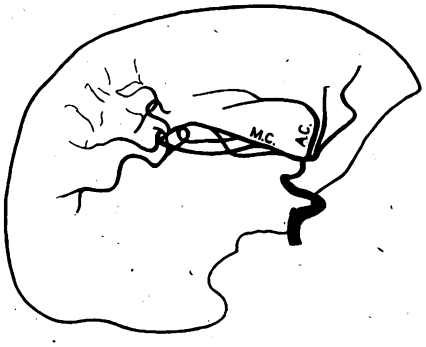

Fig. 8a

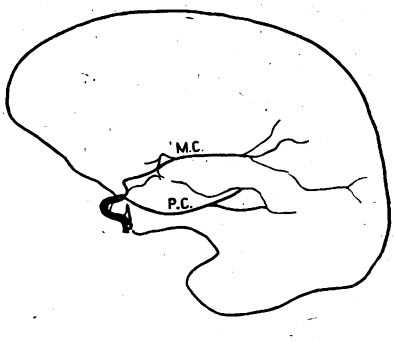

Fig. 8b

Fig. 7 (case 4)—Ventriculographic tracings 3 and 74 days after treatment was begun.

Fig. 8a and b (case 8)—Tracings of arteriograms. A.C., anterior cerebral arterial group. M.C., middle cerebral arterial group. P.C., posterior cerebral artery. (a) Right side is normal. On the 35th day of illness after five days in which his right upper limb was slightly weak, this patient developed severe aphasia and well-marked hemiparesis. Left arteriography (b) on the 97th day showed no filling of the anterior cerebral group and very poor filling of the middle cerebral group. (Compare with normal right side.) By the 125th day hemiparesis and dysphasia were recovering. On the 164th day, by which time the recovery was nearly complete, a further left arteriogram still showed no filling of the anterior cerebral group, though the filling of the middle cerebral group had improved a little.

negative at a dilution of 1/100. No acid-fast organisms were found in the gastric washings and the E.S.R. was 3 mm. in 1 hour. Lumbar puncture yielded a fluid containing 15 white cells, protein 60 mg. per 100 ml., and chlorides 700 mg. per 100 ml. No acid-fast bacilli were identified on the films and up to the time of writing cultures have proved sterile. She was treated for five days with intramuscular injections of streptomycin, 1·5 g. daily, but treatment was then withheld because no signs of disease had developed and the abnormalities in the C.S.F. were decreasing.

The child was discharged home on Nov. 13, and has been seen at weekly intervals since then. She is still well, the Mantoux reaction is still negative, and the C.S.F. is now normal.

This child had a very mild attack of meningitis from which she made a prompt and spontaneous recovery. The only evidence that the infection was tuberculous was the presence of acid-fast bacilli on the films. The fact that the organisms were found in 2 separate specimens makes an artefact unlikely, and it therefore seems that this case is either an example of the rare spontaneous recovery occasionally seen in the past or that it represents a phase in the disease that is not yet clearly recognised.

The following case in the present series was also anomalous in several important respects.

Case 18.—An air gunner, aged 22, was admitted to this hospital on July 2, 1947, with a diagnosis of tuberculous meningitis. For many years he had noticed a hard mass of glands on the right side of the neck. On June 9 he developed headache and pain in the right side of the neck and found he had a temperature of 102°F. These symptoms increased; he began to vomit, and on June 11 he was admitted to hospital elsewhere as a case of meningitis of undetermined ætiology. He was then feverish, irritable, and photophobic and his neck was a little stiff. Lumbar puncture yielded a clear fluid under slightly raised pressure containing 3 white cells per c.mm. and protein 50 mg. per 100 ml., its sugar content being normal. No organisms were seen in the films, and cultures for pyogenic organisms were sterile. During the next few days he grew worse and became hallucinated and disorientated. Lumbar puncture was again performed five days after admission; the C.S.F. now contained 40 white cells per c.mm. and protein 120 mg. per 100 ml. Two samples of the fluid were collected and examined in different laboratories; acid-fast bacilli were found independently in both specimens.

After this second puncture, and without chemotherapy, the patient improved and by June 24 was mentally normal and feeling very well, but lumbar puncture this time showed that the cells in the C.S.F. had increased to 80 per c.mm. and the protein to 160 mg. per 100 ml. The sugar content was normal and the chlorides 690 mg. per 100 ml. No organisms were found on films.

A week later the patient was transferred to Oxford. Clinically he was extremely well; there was a large mass of calcified glands in the neck but no other physical signs were found. An X-ray film of the chest was entirely clear and the sedimentation-rate was 10 mm. in 1 hour. Lumbar puncture showed that the C.S.F. was still abnormal in that it contained 46 lymphocytes per c.mm. and protein 110 mg. per 100 ml., though the chloride and sugar contents were normal. No organisms were seen on the films, cultures for *M. tuberculosis* proved sterile, and guineapig inoculation was also negative (guineapig killed four months after inoculation).

In spite of his spontaneous improvement it was considered that the patient should be given a course of streptomycin therapy since he had recently been seriously ill, the abnormalities in the C.S.F. were persisting, the previous finding of acid-fast bacilli in the C.S.F. seemed unequivocal, and he had definite evidence of a tuberculous focus elsewhere in the body. Radiography of the neck showed that the apex of the calcified mass was in close relation to one of the intervertebral foramina. This suggested that the spinal meninges might have become infected by direct spread from the diseased glands, and that the exceptionally benign course might possibly be related to this unusual ætiology. He accordingly received 2 g. of streptomycin daily for 120 days and on Oct. 9, after 92 days of treatment, the glands were excised by Mr. A. Elliot Smith.

Although the patient remained well throughout the period of observation, and although all cultures were sterile and examinations of the films of the C.S.F. were persistently negative, the cells and protein content did not revert to normal until the very end of his period of treatment. No organisms were cultured from the glands removed at operation, and guineapig inoculation with some of the material was negative.

This unverified case has been included in the present series because there seemed good evidence that the meningitis was, in fact, tuberculous and because a full course of streptomycin therapy was given. The fact that the patient began to improve before receiving streptomycin, although the abnormalities in the C.S.F. persisted for months, makes it impossible to say what the final outcome would have been had streptomycin been withheld.

VENTRICULAR STUDIES

In all except 2 of our 18 cases frontal burr-holes were made to provide access to the anterior horns of the lateral ventricles. The value of this procedure both in diagnosis and treatment is considerable.

(1) In cases where diagnosis rests between tuberculous meningitis and brain abscess or some other space-occupying lesion in the cerebral hemisphere, the latter type of lesion can usually be excluded by ventricular estimation. An abscess tends to obliterate the lateral ventricle of the hemisphere in which it lies, and in such cases the exploring brain needle usually fails to find the corresponding ventricle or yields only a few drops of C.S.F., while from the opposite lateral ventricle 20 ml. or more of C.S.F. are obtained. If 7–10 ml. or more of C.S.F. are obtained from each lateral

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ventricle it is reasonably certain that there is no abscess or tumour of one cerebral hemisphere. In cases of doubt air should be injected for immediate ventriculography.

Exclusion of brain abscess or other space-occupying lesion indicates that it is safe to proceed with intrathecal injections of antibiotics by the ventricular or lumbar routes, and in some cases of tuberculous meningitis this may be the deciding factor in enabling streptomycin treatment to be started earlier than would otherwise be safe.

(2) *M. tuberculosis* was sometimes easily found in the ventricular C.S.F. when repeated search had failed to show it in the lumbar C.S.F. For example, during the first week of treatment in case 4 films were positive in 1 of 7 consecutive specimens of lumbar C.S.F. (cultures positive in 4) and in all of 9 specimens of ventricular C.S.F. (cultures positive in 8). Films of ventricular C.S.F. remained positive for a week after they became negative in the lumbar field.

In case 1 all cultures of the lumbar C.S.F. were negative after the 29th day of treatment whereas 1 in 4 cultures of the ventricular C.S.F. remained positive up to the time of death on the 131st day; during this time the average concentration of streptomycin was approximately the same in both fluids (12 μg./ml. in ventricle and 13 μg./ml. in lumbar C.S.F.).

In case 16—a difficult case for diagnosis (the boy had already had his appendix taken out when he came to us)—33 lumbar and 2 ventricular specimens of C.S.F. were examined and the only positive finding was one culture of *M. tuberculosis* from one of the ventricular fluids.

(3) In the process of passing a blunt needle through the brain to the lateral ventricle tiny fragments of meninges or brain tissue sometimes become lodged in the needle. These can be squashed on a slide, fixed in formalin, and stained with aniline dyes (Russell et al. 1937). In case 8 this simple wet-film technique revealed a typical collection of endothelial cells.

(4) Ventricular puncture enables the spread of streptomycin in the ventricular and spinal subarachnoid spaces to be studied, as already described. Where blockage is suspected the test may occasionally be useful, but the patient should not be receiving streptomycin systemically at the time.

(5) Ventriculography may be repeated from time to time during the illness to determine the degree of hydrocephalus present.

(6) Therapeutically, access to the lateral ventricles may be important: for the administration of streptomycin when there is a spinal block; and to relieve acute rise of intracranial pressure, as in the attack of severe hydrocephalus already described.

METHODS AND CONTROL OF TREATMENT

Combined Intramuscular and Intrathecal Dosage

Since adequate supplies of streptomycin have become available we have proceeded, after a few unsuccessful attempts to simplify treatment, on the assumption that high concentrations of streptomycin should be obtained in the C.S.F. as soon as possible in the disease, and that treatment should be continued without intermission until recovery seems assured.

The aim of early treatment has been to gain access to organisms before they become embedded in granulation tissue, before the "circulation" of the C.S.F. and streptomycin has been impaired by organising exudate, and before the changes in the cerebral blood-vessels have become irreversible. Accordingly, in those cases where the clinical evidence strongly favours a diagnosis of tuberculous meningitis we do not consider it justifiable to withhold streptomycin until bacteriological confirmation is obtained, even though following this policy may mean that some cases are never verified.

A high concentration of streptomycin in the C.S.F. is aimed at to deal with any relatively resistant organisms already present at the outset of the disease (Youmans et al. 1946, Pyle 1947) and to avoid promoting resistance (McDermott et al. 1947).

We now therefore treat our patients by combined intramuscular and intrathecal injections of streptomycin in the doses already mentioned. The only 2 patients in our series (cases 13 and 14) who were treated by the intramuscular route alone during the early stage of their illness failed to make the expected improvement, in spite of the fact that the in-vitro bacteriostatic level was consistently exceeded in the C.S.F., though the high levels which follow intrathecal injections were not obtained. We are well aware of the labour and dangers of long-continued intrathecal treatment, but the experience of our cases suggests that it is indispensable.

Save in exceptional circumstances, which will be described, streptomycin treatment in this series has been continued until the end of the sixth month, or later (see table). For the first six weeks at least both the intrathecal and the intramuscular routes were used. Thereafter, if the patient was by then free from signs and symptoms, the intrathecal streptomycin was withheld, provided subsequent assays showed that satisfactory levels could be maintained in the C.S.F. by the systemic route alone. As the table shows, treatment was continued for over six months in 4 cases. It was abandoned after two to four months in 3 survivors because the C.S.F. was approaching normal, no positive cultures had ever been obtained, and the patients were clinically well.

Treatment was also abandoned before the end of the sixth month in patients who were obviously not going to recover because of external hydrocephalus, total blindness, and gross hemiplegia or quadriplegia in 3, and because of persistently positive films and cultures and protracted dementia in another.

Nothing but the coarsest neurological defects, maintained over months in spite of adequate treatment, should be regarded as an indication for abandoning treatment. In all our adult patients who ultimately recovered completely, hemiparesis and dementia with periods of stupor persisted for many weeks: they were disorientated, inattentive, incontinent, difficult to feed, with gross failure of memory for recent events, and some showed poverty or excess of emotional response; in addition there was profound wasting. In retrospect there was a gradual improvement; but from day to day, and indeed from week to week, little change was detected. These symptoms were not seen in any of the children.

Direct Administration to Interpeduncular Space

Since the disease appears to be most intense in the region of the interpeduncular space, and since obstruction of the subarachnoid space at the tentorial opening, which we have seen repeatedly, must interfere with the spread of streptomycin to the interpeduncular space, we have administered streptomycin directly to this region through indwelling fine 'Polythene' tubes. A small frontal flap was turned under local anæsthesia and the frontal lobe was elevated to expose the cisterna chiasmatica. The tubes were then inserted, one towards each Sylvian fissure with a third passing backwards above the diaphragma sellæ. Streptomycin solution (1000 μg./ml.) was injected in amounts of up to 6 ml. twice daily for ten days.

This method has been tried in 4 cases. In case 8 the attempt had to be abandoned because the brain was too tight to allow access to the region of the chiasm, while the ventricle was still so small that the brain would not be slackened by withdrawing ventricular C.S.F.; this patient ultimately made a good recovery. In case 10 the injections were well tolerated, but the patient had already developed a severe hydrocephalus from which he ultimately died. In 2 other cases, too recent to be included in this series, the injections have produced no symptoms and have been associated with well-marked improvement in what appear to be severe infections in an infant and adult respectively. In a fifth case the cisterna chiasmatica was found at operation to be already obliterated by adhesions. Streptomycin levels in the cisternal fluid after six hours were 20 to 40 μg./ml.

It is still too early for a final opinion on the effect and value of this method; all that we can say now is that it is practicable provided there is not too much brain swelling and the ventricles are sufficiently large, and provided

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that it is done before dense adhesions have formed round the chiasm, and that it is worthy of trial where the disease is already advanced when the patient is first seen.

In one survivor (case 4) 10 ml. of air was injected at each daily lumbar puncture for four weeks with the object of breaking down adhesions. The injection caused pain at the time, but no other reaction. The air was held up at the incisura level and never spread over the cerebral convolutions. We obtained no evidence as to its value.

Ventricular Drainage and Irrigation

At one time we also used continuous ventricular drainage in the early stages of the disease on the assumption that rise of intracranial pressure was an important pathological factor at that stage; the method proved unsatisfactory because withdrawal of large amounts of dilute ventricular C.S.F. was followed by a rapid rise in the protein content of the lumbar C.S.F. and probably promoted rapid blockage of the cisternæ ambiens and interpeduncularis; moreover, the reduction of intracranial pressure was not accompanied by obvious improvement in the patient's condition.

Irrigation from the lateral ventricle to the lumbar subarachnoid space with streptomycin in Hartmann's solution was carried out in 3 patients with the idea of breaking down adhesions and diluting the C.S.F. Several hundred ml. of fluid could be employed without ill effect, but also without any material benefit. The method might be of value in some cases of incipient spinal block but it probably has no effect on the cisterna ambiens, the interpeduncular space, and the proximal part of the Sylvian fissures which were the main seat of the disease in the cases treated with streptomycin (fig. 4).

Stopping Streptomycin

It is very difficult to decide when to stop giving streptomycin, particularly as its milder toxic effects are so similar to those of an attentuated meningitis. At the fifth or sixth month we have halved the dose of intramuscular streptomycin by giving injections on alternate days; in every case improvement has been accelerated and this has encouraged us to stop streptomycin completely within a few weeks. In case 12 we stopped treatment at the end of four months because of the onset of severe global deafness in a patient who was otherwise extremely well; for two weeks she improved rapidly, gaining appetite and weight in the way that all other patients have done after a long course of streptomycin; but in the third week she developed signs of a relapse and treatment was resumed.

Hydrocephalus.—In 2 patients with gross hydrocephalus (case 10 and another treated elsewhere with streptomycin and then referred to us) it was established that the blockage was at the cisterna ambiens and an attempt was made to relieve the obstruction by inserting a polythene tube between the lateral ventricle and the subarachnoid space of the Sylvian fissure. This failed in both cases. At necropsy several weeks later the outer end of the tubes was found embedded in the cortex, and it seemed that the subarachnoid space of the Sylvian fissure is not sufficiently capacious to hold the tube satisfactorily.

The treatment of acute episodes of hydrocephalus by withdrawal of fluid from the ventricle has already been described (case 4). In case 13 profound coma with respiratory distress due to hydrocephalus was relieved on several occasions by lumbar puncture, a method which we would not recommend unless it is clearly established that the hydrocephalus is of the communicating type.

General Treatment

Feeding and control of vomiting have been a very great problem in the adults and older children of our series, but not in the infants. We resorted to tube feeding in 10 patients, supplemented in some cases by intravenous plasma and glucose saline. Even when large quantities of food have been given and retained, loss of weight has been rapid and severe and associated with a fall in plasma albumin. For example, in a soldier of 19 (case 6) weight fell from 133 lb. to 70 lb. in 41 days.

In 4 cases the illness has been complicated by a superadded pyogenic infection requiring penicillin or sulphonamide therapy. These infections have included staphylococcal and pneumococcal pneumonia and urinary infection due to *Bact. coli*. Cross-infection is also a hazard especially in children. Thus in case 7 the child developed chickenpox, measles, and a β-hæmolytic streptococcal pharyngitis successively during the course of his illness.

Streptomycin therapy of tuberculous meningitis thus throws a very heavy strain on all concerned. At its conclusion our adult patients, though in other respects well, have usually been emaciated but have promptly gained weight at the rate of 2–5 lb. a week. All patients have been given full sanatorium treatment for several months after discharge from hospital, with initial rest in bed followed by carefully graded exercise. In one adult patient who developed bulimia (case 8) the period of severe wasting ended before streptomycin was stopped.

RESULTS

It is still too early to assess the final results, since the longest survival period to date after cessation of treatment in our series is five months (case 2). Hinshaw et al. (1946) reported a relapse some time after treatment had ceased, and relapse or tuberculoma of the brain must be considered a possibility in our series. However, the immediate results are of interest, especially when the quality of the physical and intellectual recovery is considered. In the 7 survivors (4 adults and 3 children) of our series who have stopped treatment the neurological recovery is complete except for loss of caloric response and high-tone deafness in all 4 adults (children not tested but not obviously deaf). In 1 patient, who had for some weeks a severe right hemiplegia and aphasia, slight weakness of the right hand persists, with occasional generalised fits beginning in the right hand. Ataxia was present in 2 patients during the later stages of treatment but has since almost disappeared, though 1 patient is still unsteady when walking in the dark. Recovery of weight and strength has already been mentioned.

The behaviour of all 7 survivors is normal. None has yet returned to his former occupation. Of the adult patients only case 18 was completely normal mentally all the time he was under observation, though, like the others in the series, he had been demented in the acute phase of the illness and he still has an amnesia for that phase and for the period immediately preceding it. Psychometric tests were carried out in 4 of the other 6 survivors, and these, combined with previous school reports and information from the relatives, indicate a recovery to the intellectual level which existed before the illness, with the possible exception that there was still a slight slowing of response.

The C.S.F. has returned to normal in 6 of the 7 survivors. The other patient (case 7), who still had slight rise of cells and protein at the last observation, has not had his C.S.F. examined since he stopped treatment. Case 2 exemplifies the details of recovery of the C.S.F. (fig. 1).

Thus the early functional results in the survivors may be regarded as highly satisfactory—almost as good as we have seen after pyogenic meningitis. The 7 survivors who have ceased treatment include 3 unverified cases, 2 of which have been described (cases 16 and 18). The other 4 were proved cases of severe tuberculous meningitis, and we conclude that the practical value of

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streptomycin in the treatment of tuberculous meningitis has been established.

We would like to express our gratitude to those who have been associated with us in this work, especially the medical and nursing staff of the department of pædiatrics of the Radcliffe Infirmary, who have undertaken the care of the children in this series; to Captain P. K. Robinson and Captain E. S. Clarke, of the Military Hospital for Head Injuries, who have cared for the Service cases; and to Dr. Harley Stevens, of the Bucks and Berks County Sanatorium, who has taken charge of several of our convalescent patients.

REFERENCES

Cairns, H., Duthie, E. S., Smith, H. V. (1946) *Lancet*, ii, 153.
Hinshaw, H. C., Feldman, W. H., Pfuetze, K. H. (1946) *J. Amer. med. Ass.* **132**, 778.
Jepson, R. P., Whitty, C. W. M. (1946) *Lancet*, i, 228.
McDermott, W., Muschenheim, C., Hadley, S. J., Bunn, P. A., Gorman, R. V. (1947) *Ann. intern. Med.* **27**, 769.
Pyle, M. M. (1947) *Proc. Mayo Clin.* **22**, 465.
Russell, D. S., Krayenbuhl, H., Cairns, H. (1937) *J. Path. Bact.* **45**, 501.
Smith, H. V., Daniel, P. (1947) *Tubercle*, **28**, 64.
Youmans, G. P., Williston, E. H., Feldman, W. H., Hinshaw, H. C. (1946) *Proc. Mayo Clin.* **21**, 126.

REITER'S SYNDROME

REPORT ON NINE CASES

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SINCE the triad of arthritis, conjunctivitis, and urethritis was described by Reiter in 1916, little has been heard of this syndrome; but many physicians serving in the Middle East during the late war were familiar with it as arising in the course of, or during convalescence from, acute bacillary dysentery. More recently cases have been encountered without any apparent connexion with dysentery; 9 such cases met with in British troops in Western Germany in a period of nine months are described here.

References to the condition in British publications are scarce, but Jackson (1946) described 2 cases with the triad and 1 in which arthritis, conjunctivitis, and a rash were present but urethritis was absent. We also have encountered 6 cases with the partial syndrome; they are not included in this series. Wrigley (1946) described 1 case with the full triad, and Harkness (1945) mentioned keratodermia blennorrhagica as occurring with the syndrome. Colby (1944) emphasised the renal complications and noted the terminal hæmaturia, the hydronephrosis, and the chronic pyelonephritis that may develop. He also cited a case in which the whole syndrome recurred after four and a half years, and it is interesting to note that case 2 in the present series is a recurrence after six years. Rosenblum (1945) gave a short account of 10 cases and mentioned that relapses may develop after two and a half years. He described an eruption resembling erythema multiforme, and arthritic involvement of interphalangeal joints, and he considered that salicylates, sulphonamides, and penicillin are not beneficial.

Case 1.—A sergeant, aged 28, suffered from exposure on Jan. 29, 1946, and was admitted to hospital with a swollen painful right knee, with effusion into the joint and the quadriceps much wasted. He was pyrexial, toxic, and ill. Urine sterile, with many pus cells. Erythocyte-sedimentation rate (E.S.R.) 117 mm. in 1 hour (Westergren). On Feb. 26 a slight urethral discharge was noted. Three smears of pus and two cultures were negative for gonococci. On March 2 Hb was 72% (Sahli); red cells 3,960,000 per c.mm.; white cells 10,200 per c.mm. The knee was less painful, but the proximal interphalangeal joint of the left second toe was involved. On the 6th a catarrhal conjunctivitis appeared, and the first metacarpophalangeal joint and the terminal interphalangeal joint of the left middle finger were swollen and painful. Penicillin (1,000,000 units) and sulphathiazole (30 g.) were given, but no definite improvement resulted. On the 8th a morbilliform rash appeared and rapidly became generalised but spared the legs, feet, and hands. It was accompanied by an increase in the fever to 103°F which was at first attributed to the sulphathiazole. On the 13th the patient complained of hardness of the soles of the feet, which were keratotic and covered with brown incrustations. On the 20th the rash recurred, though the patient was not having any sulphonamides, and it persisted five days. The patient very gradually improved, and by March 25 only a slight evening pyrexia was present. It was decided to try the effect of protein shock. A course of intravenous T.A.B. was begun, and there was further steady improvement, until finally there was full and painless movement. The patient was evacuated on May 28.

Case 2.—A private, aged 19, was treated on Jan. 9 for non-specific urethritis following exposure. Penicillin 150,000 units was given. On the 13th the urethritis recurred, and he was readmitted to the special treatment centre. No evidence of gonorrhœa was discovered, but after a few days there were effusions into both knee-joints and a bilateral conjunctivitis; E.S.R. 88 mm. in 1 hour. On Feb. 16 the patient was transferred to the medical division.

The man's past history included a similar condition in 1940, for which he had been treated at Selly Oak Hospital, Birmingham, and the diagnosis at that time was Reiter's disease.

On examination there was much periarticular swelling of both knees, with gross limitation of movement and some flexion deformity, and extreme wasting of calf and thigh muscles. The tarsal joints of both feet were involved, and there was a bilateral conjunctivitis. Hb 83%; red cells 4,140,000 per c.mm.; white cells 11,000 per c.mm. Radiography of the knees was normal, but the feet showed some loss of pencil outline. A slight pyrexia was present. Two prostatic smears and cultures revealed no gonococci. The patient improved gradually, but by Feb. 27 keratodermia blennorrhagica had developed on the soles of both feet. The gonococcal complement-fixation test was negative. On March 7 a slight urticarial rash over both arms appeared and it persisted a few days. On the 15th intravenous T.A.B. was started, and considerable improvement took place, though the E.S.R. was 75 mm. in 1 hour. On April 4 the conjunctivitis of the right eye returned with retro-orbital pain; it did not respond to penicillin but finally resolved.

The patient's general condition improved and he was finally discharged fit (E.S.R. 4 mm. in 1 hour) on May 25.

Case 3.—A captain, aged 30, noticed on Jan. 30 a profuse purulent urethral discharge, with frequency of micturition, dysuria, and terminal hæmaturia. Tests negative for gonococci. On Feb. 1 a severe bilateral conjunctivitis appeared, and a course of sulphathiazole (25 g. in five days) was begun. Hb 94%; red cells 5,120,000 per c.mm.; white cells 12,000 per c.mm. On the 3rd he complained of slight stiffness of both knees, and the E.S.R. was 35 mm. in 1 hour. Next day there was definite effusion in the left knee and slight swelling of the right knee. On the 9th there was pain in the metacarpophalangeal joint of the right ring finger. The urethral discharge was now much less and the conjunctivitis subsiding. On the 11th he looked pale and his hæmoglobin had fallen to 68%; red cells 3,880,000 per c.mm.; white cells 10,300 per c.mm.; E.S.R. 110 mm. in 1 hour. The man's condition steadily improved, and on March 6 he was discharged.

Case 4.—A gunner, aged 33, noticed a urethral discharge on Dec. 9. Smears were negative for gonococci. He was treated with sulphathiazole 25 g. and penicillin 150,000 units in the special treatment centre. His discharge cleared, but on Jan. 10 he was admitted to a camp reception station with bilateral conjunctivitis, and on the 12th he complained of pain in the left hip and left knee, which later became swollen. On the 22nd he was admitted to hospital.

On examination there were effusions in both knees, which were swollen, but movements were full and painless. There was much wasting of quadriceps; E.S.R. 82 mm. in 1 hour. Urine: pus cells ++++; culture *Bact. coli*. White cells 9800 per c.mm. The left lobe of the prostate was boggy and tender, and a bead of creamy pus was expressed through the urethra. No gonococci were found in the smear. On Feb. 7 the urine again yielded *Bact. coli* on culture, but after a course of sulphathiazole it became sterile. By the 16th the right knee was normal, but the left knee, though improved, still contained a small effusion. On Feb. 28 hyperkeratosis of

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the soles was present but by March 19 this had largely resolved, and the patient was fit to leave hospital.

Case 5.—A private, aged 40, was treated for gonorrhœa (smear positive) on May 12 with 150,000 units of penicillin. His discharge cleared, but on the 17th he developed bilateral conjunctivitis and he was admitted to hospital on the 18th. On the 21st he had severe pain in the left hip, two days later his urethral discharge recurred, and soon the right ankle became swollen and painful. Moderate pyrexia was present, and the left hip was held semiflexed and was exquisitely tender on movement. Smears and cultures from the urethral pus revealed no gonococci. On the 30th a course of penicillin 1,000,000 units was begun. On June 1 the left knee was painful and tender and a balanitis with superficial ulceration of the glans was noted. On the 5th E.S.R. 90 mm. in 1 hour; Hb 84%; red cells 4,500,000 per c.mm.; white cells 10,500 per c.mm. Urine sterile. He was given T.A.B. intravenously and began to improve.

The man was evacuated to England still ill on June 27.

Case 6.—A sergeant, aged 25, had previously had gonorrhœa in January, 1945. On Jan. 13, 1946, while on leave, he developed a purulent urethral discharge (smear positive) and was treated with sulphathiazole. The discharge never cleared properly, and on Feb. 12 his left knee was painful and swollen. The prostate was tender and softened, and copious prostatic secretion was obtained which was negative for gonococci. A course of penicillin was given without dramatic improvement, and on Feb. 20 a bilateral conjunctivitis began. The left knee-joint was aspirated on the 23rd and yielded a straw-coloured fluid with clot. The cells were mostly lymphocytes, and the fluid was sterile. On March 7 there was hyperkeratosis of the soles of the feet and at the site of the penicillin injection.

The man was treated with intravenous T.A.B. and made a good recovery, being discharged on April 17.

Case 7.—A private, aged 22, noticed a urethral discharge on March 11. No evidence of gonorrhœa was forthcoming, and he was treated with sulphathiazole. On the 13th he had pain in the right knee, which was swollen and painful on movement, and a mild bilateral conjunctivitis was present. The left knee soon became affected. On the 23rd the E.S.R. was 88 mm. in 1 hour; white cells 9900 per c.mm.

He improved rapidly and was discharged on April 26.

Case 8.—A gunner, aged 23, was treated for gonorrhœa (smear positive) on May 6 with 150,000 units of penicillin. On the 13th he developed a conjunctivitis. On the 16th there was pain in the right knee, and next day in the right heel. He was again treated with penicillin, without improvement, and on the 27th a fresh urethral discharge was noted. Subsequently he developed an arthritis with effusion into the right knee and arthritis of the right second metacarpophalangeal joint. On June 6 intravenous T.A.B. therapy was begun, and the man's condition improved. A balanitis, with excoriation of the glans penis, developed just before he was evacuated home on June 23.

Case 9.—A sergeant, aged 26, had had urethritis six weeks before admission to hospital with pain and swelling of the left knee. A mild transient conjunctivitis was present, and he was discharged fit after four weeks' treatment.

DISCUSSION

The ætiology is obscure. The condition has been described only in males, usually young adults. Reiter thought his original cases were due to a spirochæte, but this has not been substantiated. Manson-Bahr (1944) looks on the syndrome as only the familiar dysenteric polyarthritis with superadded toxic manifestations, and Beiglböck (1943) regards it as an allergic reaction to dysenteric infection, because in most cases the serum agglutinates Flexner organisms. Harkness (1945) claims to have discovered inclusion bodies in pus from the urethral discharge. Rosenblum (1945) obtained a relevant history of sexual intercourse in only 1 of his 10 cases, and Jackson (1946) maintained that in spite of the superficial resemblance of the manifestations to the complications of gonorrhœa the condition bears no relation to that disease.

However, in the present series 2 patients had gonorrhœa five and seven days before the onset of symptoms; 2 others admitted exposure within seventeen days; and 1 had had gonorrhœa a year previously. In spite of diligent search by members of the special treatment centre, no evidence of active gonococcal infection was obtained in this series.

The present cases do not seem to have been associated with dysentery, and very few cases of dysentery were admitted to hospital during the period. Reiter's syndrome has some similarities to allergic manifestations, and the arthritis, the rashes, and the raised E.S.R. can all be explained on this basis. The anæmia, however, which may develop very rapidly, as in case 3, remains to be explained.

The partial syndrome, to which Jackson (1946) drew attention, merits consideration. It is at least possible that some cases have been regarded as gonococcal arthritis. Before diagnosing the partial syndrome it would be necessary to decide what combination of symptoms or signs could fairly be taken as criteria; probably at least two of the triad, one of them arthritis, would be necessary.

SUMMARY

Nine cases of Reiter's syndrome in soldiers aged 19–40 are described.

The knee-joints were affected in all cases, and the small joints of the hands and feet in some.

Two patients had had gonorrhœa a few days before the onset of symptoms; in two cases there was evidence of prostatic infection, and in one urinary infection.

Anæmia was present in some cases, and in most instances the erythrocyte-sedimentation rate was greatly increased.

The condition varies in severity and appears to derive benefit from intravenous T.A.B.

We wish to thank Major-General Sir Alexander Biggam, K.B.E., K.H.P., for permission to publish these notes, and Major H. A. Palmer, R.A.M.C., for much valuable help with the cases.

REFERENCES

Beiglböck, W. (1943) *Dtsch med. Wschr.* **69**, 803.
Colby, F. H. (1944) *J. Urol.* **52**, 415.
Harkness, A. H. (1945) *Brit. J. vener. Dis.* **21**, 93.
Jackson, W. P. U. (1946) *Brit. med. J.* ii, 197.
Manson-Bahr, P. (1944) *Trop. Dis. Bull.* **41**, 571.
Reiter, H. (1916) *Dtsch. med. Wschr.* **42**, 1535.
Rosenblum, H. H. (1945) *U.S. nav. med. Bull.* **44**, 375.
Wrigley, F. (1946) *Brit. med. J.* ii, 199.

DIABETES INSIPIDUS DUE TO SPHENOIDAL SINUSITIS

REPORT OF A CASE

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SPHENOIDAL sinusitis is such a rare cause of diabetes insipidus that the following case seems worthy of record; it also demonstrates a satisfactory response to 'Pitressin' tannate in oil.

A woman canteen worker, aged 39, was admitted to hospital in June, 1942. She had been quite well until six weeks previously, but since then she had had headaches, nasal discharge, and epistaxis. She had lost about 2 st. in weight and complained of severe thirst and frequency of micturition. She came from a healthy family and, apart from rheumatic fever at the age of 21, had always been quite well.

On examination she appeared toxic and wasted. There was complete left and partial right nasal obstruction, with crusting and superficial ulceration of the nasal mucosa. Bilateral middle-ear deafness was present. Her fundi and fields of vision were normal, and no abnormality was found in the central nervous or any other system. The commoner causes of diabetes insipidus were excluded by the following findings: blood Wassermann reaction negative; cerebrospinal fluid under normal pressure, with cells, protein, and Lange

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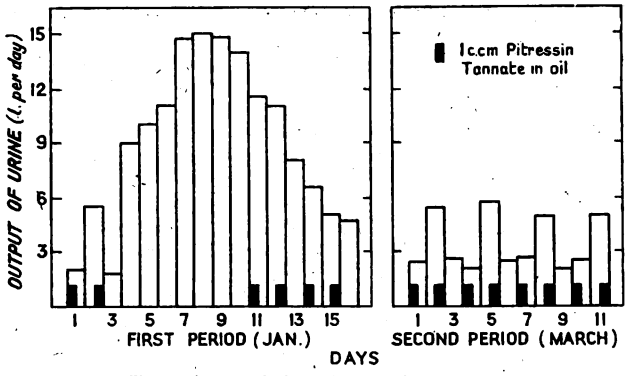

Fig. 1—Effect of pitressin on urinary output.

curve normal, and Wassermann reaction negative; Hb 98%; leucocytes 9500 per c.mm. (neutrophils 80%, lymphocytes 17%, monocytes 3%).

Radiography of skull and pituitary fossa showed no bony abnormality; but it showed a pansinusitis: both maxillary antra were opaque, and there was thickening of the lining membranes of both frontal, all ethmoidal, and both sphenoidal sinuses.

On admission the patient was passing 9–15 litres of urine daily (15–25 pints), the specific gravity of which never registered higher than 1·000. She showed a definite though transitory response to soluble 'Pituitrin,' and was then given a daily intramuscular injection of 1 c.cm. of pitressin tannate in oil. Her urinary output fell to 6–8 litres, but in spite of this she became increasingly ill, and her temperature rose to 102°F. After a course of sulphapyridine 9 g. she developed an acute generalised exfoliative dermatitis, with frequent vomiting and the loss of a further stone in weight. After several antrum punctures had revealed pus and debris, bilateral intranasal antrostomy was performed by Mr. C. P. Wilson on Aug. 28.

As her general condition improved, so did her response to the pitressin, and at the time of her discharge on Oct. 13 her urinary output varied from 3 to 6 litres daily, and she was gaining weight and felt much better.

Soon after discharge she found that her ankles were becoming swollen; this appeared to be due to water retention and was relieved by giving the pitressin every 36 hours instead of every 24 hours. In January, 1943, the effect on the urinary output of omitting the injections of pitressin was demonstrated (fig. 1). The urinary output rapidly increased, and by the fifth day had reached 15 litres, but was reduced to its former level five days after restarting the regular injections. Fig. 1 also shows the urinary output in eleven days in March, 1943, while pitressin was being given regularly. Her nasal condition had improved, though her antrum washouts still contained pus and she had frequent epistaxes. Her general condition, however, was much improved, and she asked permission to return to work.

She remained fairly well until January, 1944, when she complained of vomiting and swelling of the ankles; and, though she had omitted the injections, the polyuria had disappeared. She was readmitted, and during the next three weeks she became steadily worse. Her urinary output fell to below 500 ml. daily, and the urinary deposit showed a moderate number of red blood-cells and occasional leucocytes. She became drowsy, with increased vomiting and severe tetany and a white frost appeared on her forehead; she died in renal failure on Feb. 21. A few hours before death her blood-urea was 357 mg. per 100 ml. and the blood-calcium was 4·6 mg. per 100 ml.

Necropsy (Bland-Sutton Institute).—The immediate cause of death was clearly advanced bronchopneumonia, with small abscesses scattered throughout both lungs. Apart from the findings in the head (see below) the only other grossly abnormal organs were the *kidneys*. Both were enlarged and had the flea-bitten surfaces usually associated with subacute bacterial endocarditis, though the heart in this case was normal. Microscopically, the kidneys showed a combination of subacute glomerulotubular nephritis and multiple glomerular embolisation.

Head: no abnormality of brain substance was detected, and there was no evidence of recent or old meningitis at the base. The clinoid processes were removed to expose the pituitary; but, as the gland was firmly adherent to the sella turcica, the basisphenoid, including the pituitary and sphenoidal sinuses, was removed in one piece. The various air sinuses were then examined; all except the right frontal had thickened lining membranes, with areas of ulceration covered by hæmorrhagic crusts, and with mucopus filling them. Both antra had wide openings into the general nasal cavity, the walls of which showed similar thickening, ulceration, and crusting. The left middle ear contained thick green pus; the right middle ear was full of inspissated pus. The creamy pus from the left frontal sinus grew *Strep. viridans* in pure culture.

The basisphenoid was then sawn through in the midline sagittally, exposing the sphenoidal sinuses. The septum between the sinuses was well to one side of the midline, and both were full of mucopus. One half of the basisphenoid, with the bisected pituitary in situ, was decalcified, and sections were cut. Fig. 2, a diagram of the microscopic appearances, shows one sphenoidal sinus with a lining layer of epithelium and a greatly thickened fibrous submucous layer infiltrated by many plasma cells and lymphocytes, with occasional polymorphs; the cavity was full of mucus and fibrin entangling many pus cells. Above the sphenoidal sinus, and separated from it by a thin plate of bone, the pituitary fossa is shown. There was a thick zone of fibrous tissue, in which were collections of chronic inflammatory cells, arranged concentrically round the gland. The posterior lobe was small and necrotic, being represented only by granular eosinophilic

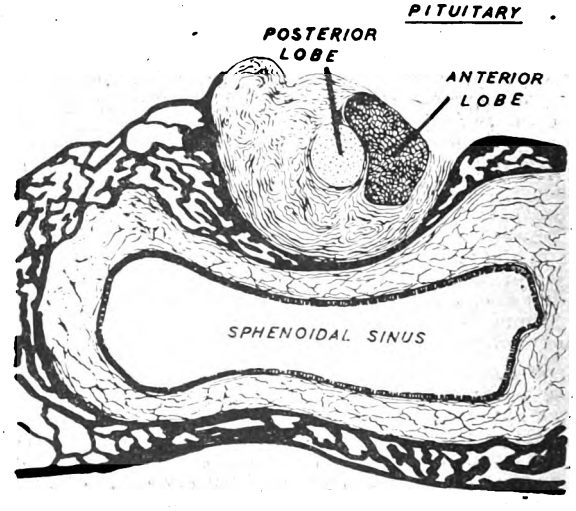

Fig. 2—Diagram of a midline sagittal section through pituitary fossa and sphenoidal sinus.

material with no recognisable nuclei or structure, except a very small area at the base of the stalk. The anterior lobe showed some fibrosis of its stroma, though the parenchymal cells appeared normal. Between the two lobes a small area of colloid, with no intact cells surrounding it, indicated the remains of the pars intermedia.

DISCUSSION

The changes in the pituitary region were interpreted as the end-result of previous inflammation causing diabetes insipidus but in no way immediately responsible for the patient's death. Inflammation in the wall of the sphenoidal sinus had apparently extended through the thin plate of bone into the pituitary fossa, and an inflammatory exudate, subsequently organised into fibrous tissue, had surrounded the pituitary gland, cutting off the blood-supply to, or in some other way leading to the death of, the greater part of the posterior lobe.

A more active inflammation of the other cranial sinuses, particularly the left frontal, was regarded as responsible for the nephritis which led to uræmia and death. Though focal embolic nephritis is usually found in endocarditis, commonly of the subacute bacterial type, instances are on record where the typical renal lesions were associated with an infection elsewhere in the body in the absence of endocarditis. Fahr (1925) described multiple glomerular embolisation in the kidneys of a girl of 12 who had middle-

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ear disease followed by purulent venous-sinus thrombosis; and Bell (1932) found the lesions in the remaining kidney of a man who died of wound infection following nephrectomy.

We have found in the literature only one case of diabetes insipidus following sphenoidal sinusitis. Yaskin et al. (1942) described a case in which mild diabetes (2–3½ litres daily) occurred for two weeks in a patient with purulent frontal and sphenoidal sinusitis. At necropsy, purulent osteitis of the sphenoidal bone, with basal meningitis, was found. In a previous paper Yaskin (1939) reported 91 cases with neurological complications following infection of the paranasal sinuses, but in no case was there diabetes insipidus.

Boggs and Winternitz (1919) reported a case of purulent sphenoidal sinusitis with direct extension through the sella turcica producing an acute suppurative hypophysitis. The patient died in coma after an illness of six weeks, and at necropsy the sphenoidal sinuses were full of thick pus, and the pituitary was surrounded by granulation tissue containing streaks of pus; the gland was friable, and microscopical examination showed areas of necrosis, mainly in the posterior lobe. There is no mention in the case-record of the amount of urine passed daily, though four days before death the specific gravity of the urine was normal.

Diabetes insipidus may develop in chiasmal arachnoiditis, and this condition is sometimes associated with sinusitis. Bollack et al. (1937) reviewed 63 cases in the literature and described 66 of their own; in these 129 cases there were 15 cases of diabetes insipidus, and in 15 cases sinusitis or rhinitis was mentioned in the ætiology. In only one case, however, did rhinitis and diabetes insipidus occur together.

It is surprising that the pituitary gland is not more often affected by inflammation of the sphenoidal sinus, in view of their close anatomical relationship; and no case of diabetes insipidus should be considered "idiopathic" before the sinuses have been examined.

The satisfactory treatment of diabetes insipidus with pitressin tannate in oil is now well confirmed. An interesting feature of the present case was the considerable resistance to treatment while the patient was febrile; even on 1 c.cm. daily her urinary output varied from 3 to 9 litres in 24 hours. It was not until her condition improved that she was adequately controlled on 1 c.cm. every 36 hours.

SUMMARY

A case of diabetes insipidus is described in which the onset of the disease was related to a pansinusitis.

During life the polyuria was adequately controlled by injections of pitressin tannate in oil.

At necropsy there were changes due to chronic inflammation in the sella turcica, with necrosis of the greater part of the posterior lobe of the pituitary, and inflammation of all but one of the cranial air sinuses.

Previous cases of the association of sinusitis and diabetes insipidus are reviewed, and it is suggested that the possibility of the spread of inflammation from a sphenoidal sinus to the pituitary fossa should be considered before any case of diabetes insipidus is classed as "idiopathic."

We are grateful to Dr. G. E. Beaumont and to the late Prof. J. McIntosh for permission to publish this case and for their helpful criticism.

REFERENCES

Bell, E. T. (1932) *Amer. J. Path.* **8**, 639.
Boggs, T. R., Winternitz, M. C. (1919) *Bull. Johns Hopk. Hosp.* **18**, 56.
Bollack, J., David, M., Puech, P. (1937) Les arachnoidites opto-chiasmatiques. Paris.
Fahr, T. (1925) in Henke and Lubarsch's Handbuch der speziellen pathologischen Anatomie und Histologie. Berlin; vol. VI, p. 358.
Yaskin, J. C. (1939) *Arch. Otolaryng., Chicago*, **30**, 157, 360.
— Lowey, F. H., Schwarz, G. A. (1942) *Arch. Neurol. Psychiat., Chicago*, **48**, 119.

New Inventions

MODIFIED MILLIN BOOMERANG NEEDLE

FOR RETROPUBIC PROSTATECTOMY

CLOSURE of the incision in the prostatic capsule and adequate hæmostasis are facilitated by the use of a modified Millin boomerang needle (fig. 1). The Reverdin type of needle, in which the suture is carried through the tissues in a slot, is replaced by one with a partially tunnelled and a partially grooved convex edge and provided with an anteroposterior eye about ¼ in. from the point. A spool of catgut, as used with the Singer surgical stitching machine, is housed in a metal casing mounted on the narrow shaft of the needle-holder.

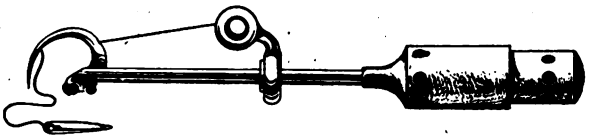

Fig. 1.

The catgut is fed from the reel to the tunnel on the convex edge of the base of the needle, continued along the groove, and then threaded through the eye. To the free end of the suture is attached a small metal shuttle.

In suturing the prostatic capsule (fig. 2) the procedure is identical with that in which the Millin needle is used, except that the suture is carried through with the needle instead of being pulled through as the needle returns through the tissues. When the boomerang effect is produced, the catgut makes a chord with an arc of the needle. Through this space, between needle and suture, the small metal shuttle attached to the free end of the catgut is passed by an assistant using an ordinary surgical needle-holder (fig. 2, inset). The needle is then withdrawn and the procedure repeated to introduce the next suture. Regulation of tension on the suture will cause the stitches to fall into place, producing adequate apposition and compression of the everted edges of the incised prostatic capsule. The type of suture produced is a lock stitch as made by the domestic sewing-machine. The most suitable suture material is no. 0 plain catgut, wound on a bobbin by the manufacturers (Davis and Geck Inc., Brooklyn, N.Y., U.S.A.). It is, however, easy to wind the bobbin by hand. The usual model of Millin boomerang needle can readily be converted to the new type by changing the needle and adding the bobbin casing, which is attached and adjusted to the shaft with a split bushing and secured by a set-screw.

Clinical trial has demonstrated the following advantages in the use of the needle:

(1) Technically, suturing of the capsule is simpler. In the confined space of the cave of Retzius it is much easier to pass the metal shuttle through the space between the catgut and the needle than to insert a suture into the

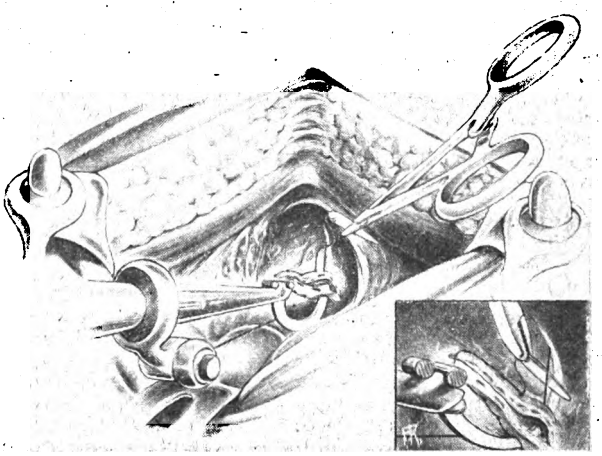

Fig. 2.

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minute slot on the convex surface of the Millin needle with a long Harris ligature-carrier.

(2) There is less trauma to the tissues.

(3) A tight hæmostatic suture line is secured which effectively seals the severed ends of the large veins of the plexus within the prostatic capsule. There is less post-operative venous oozing into the cave of Retzius. A much greater degree of control of bleeding is possible than with the older over-and-over type of suture line. Packing and the use of hæmostatic agents are unnecessary.

(4) The catgut used in suturing remains entirely outside the cavity of the prostatic urethra and cannot act as a foreign body.

Thanks are due to Mr. A. Malton for his technical assistance.

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Reviews of Books

Cisti e Pseudocisti del Polmone

Dr. GUIDO RIZZI; Dr. ODDONE DE LORENZI, Instituto Nazionale della Presidenza Sociale, Centro Ospedaliero Sanatoriale, Forli. Faenza: Fratelli Lega. 1947. Pp. 366.

CYSTS, whether containing fluid or air, present problems in diagnosis and pathology. This comprehensive monograph covers all forms of parasitic, congenital, and acquired cysts, and is the result of a detailed and painstaking study. Parasitic, dermoid, pleural, diaphragmatic, and œsophageal cysts are described, but most attention is given to cysts of the lung and bronchi. These are discussed minutely, with reference to the ætiological factors and pathology. The authors give details of 24 instances of single pulmonary and 30 of multiple cysts which they have seen in their practice, and their radiographic and histological illustrations are highly informative. Their monograph should be regarded as a standard and authoritative work. Its arrangement and style are such as to make it almost comprehensible by those who cannot read Italian.

The Natural History of Disease

(2nd ed.) JOHN A. RYLE, M.A., M.D., F.R.C.P., professor of social medicine, University of Oxford. London: Oxford University Press. 1948. Pp. 484. 22*s.* 6*d.*

FOR twelve years this collection of papers has been favourite reading, especially for young physicians. It has good clinical descriptions of many conditions to which the formal textbooks do scant justice. By precept and example it urges careful clinical observation and record, thoughtful diagnosis and prognosis, and treatment based on knowledge rather than credulity; at the same time it shows medicine as a human art, not to be practised without sympathy and imagination. A new edition is welcome, for this essential sound approach is threatened today by chemotherapeutic rules of thumb, by excessive specialisation, and by the elaborate organisation of medicine. The book is little changed. There is a valuable new chapter on "nosophobia"—the fears of disease which doctors too seldom allay and too often engender. Another on the social pathology of rheumatic fever is an excursion into social medicine, the natural history of disease in the community. Chapters which are outdated, such as that on lobar pneumonia, have been allowed to stand as period pieces, and they wear well. The reader will find here two things urgently needed by the doctor today—clear-headedness, and a perspective in which the human individual occupies the principal place.

Approaches to Tumor Chemotherapy

Editor: FOREST RAY MOULTON. Washington: American Association for the Advancement of Science. 1947. Pp. 442.

THE aim of this volume is to set forth a fairly representative view of the present state of the field of tumour chemotherapy. Like its predecessors in this series of publications on various aspects of cancer research by the A.A.A.S., it contains papers contributed to recent conferences on the subject together with verbatim reports of the discussions which followed. These enormously enliven the reading of symposia in a developing subject. Two of the outstanding contributions are by W. H. Woglom and C. Huggins. The first is a critical review of attempts at cancer therapy, with (as one would expect) a useful reference list. In a chapter on the anti-androgenic treatment of prostatic carcinoma in man, Huggins relates very simply and clearly part of the history of his valuable method and reveals equally clearly its limitations. Reports and reviews of all the newer test substances are included under the headings nutritional factors (e.g., folic acid and *L. casei* factor), bacterial products, nitrogen mustards. Accounts are given of treatment with radioactive phosphorus and urethane (the last a contribution from Manchester and London). It is somewhat to be regretted that the treatment of thyroid tumours with radioactive iodine is not dealt with, nor is there mention of the action of stilbamidine in multiple myelomatosis. These were perhaps insufficiently advanced in 1945–46 when most of the other contributions were made.

Diseases of the Breast (London: J. & A. Churchill. 1948. Pp. 128. 8*s.* 6*d.*).—Sir Crisp English has here given a brief account of the diseases of the breast and their treatment, basing his observations on a series of 250 patients treated in private practice. It is of course impossible to discuss the subject fully in 123 pages of text printed in large type, and the consequence of an otherwise laudable brevity is that this book is in some respects too vague for the student, while it is unlikely to add much to the knowledge of qualified practitioners. It is, however, very easy reading.

L'œuvre de Louis Pasteur (Paris: Masson. 1947. Pp. 108. Fr. 220).—Prof. Pasteur Vallery-Radot rendered a notable service when he presented the achievements of Pasteur from the beginning of his career, and Henri Simonnet has now given us an epitome of that great work. He follows closely the larger and more detailed study. As he says, Pasteur's vast services to humanity are not yet fully appreciated.

Diseases of the Nose and Throat (Philadelphia and London: J. B. Lippincott. 1947. Pp. 576. 72*s.*).—In this book by Dr. Charles J. Imperatori and Dr. Herman B. Burman, of New York, the right emphasis is laid on the exhibition of sulphonamide drugs and penicillin in acute infections, although the doses advised are somewhat smaller than those in current use here. The subject matter is treated simply, and the general practitioner and senior student, for whom the book is designed, will find all the information they will ordinarily require. The authors do not always follow contemporary practice, and it is questionable whether their American colleagues will agree with the suggested operative treatment of frontal sinusitis. The section on the pathology of chronic sinusitis is excellent.

Handbook of Communicable Diseases (2nd ed. London: H. Kimpton. 1947. Pp. 992. 42*s.*).—To the new edition of his successful book Prof. Franklin H. Top, of Detroit, has added 14 chapters contributed by specialists. The communicable diseases now described include nearly all those—acute or chronic, common or rare—occurring in the United States. Valuable features are chapters by nursing experts on management in hospital and in the home, and on physiotherapy in the treatment of poliomyelitis. "Handbook" seems too modest a term to describe this comprehensive volume, which is weighty in both senses.

Science in Transition (London: Christopher Johnson. 1947. Pp. 244. 10*s.* 6*d.*).—In spite of what, in our human outlook, may be regarded as notable discoveries in the realm of science, man has only begun to open the door of nature's vast laboratory. We know, for instance, a good deal about the outer part of the atom but little about its inner nucleus, the laws which govern it, or of what particles it is made. The late war caused a serious disruption in orderly long-term research, on which, as Mr. A. W. Haslett points out, future progress must depend. Meanwhile physics and chemistry hold the field, and, in his opinion, biological sciences have lagged behind. The two biggest problems of medicine, as he sees it, are the chemical control by the body of its own working, and the chemical control by the doctor of man's natural enemies. In his thoughtful little book the chapters on radar are among the most fascinating.

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THE LANCET

LONDON: SATURDAY, APRIL 24, 1948

The Two Policies

THROUGH their representatives, of all political parties, the people of this country have decided that the care of the sick shall become a public responsibility. The steady improvement in health during the past hundred years has been largely the result of State intervention, through the public-health service, and in view of the growing cost of medical attention there is a strong case for public provision of comprehensive curative services, already foreshadowed by National Health Insurance and municipal control of the large majority of hospital beds. The National Health Service Act affords a sound basis for the management of hospitals and enables every citizen to consult his doctor without financial impediment. Since the Act was introduced we have continuously urged that the profession should freely accept it as the framework of future work, and should coöperate helpfully with the Government in making the scheme as good as possible; which implies among other things that the doctor must remain responsible to his patient and must have satisfactory conditions for his labour and life. This our policy, however, has run counter to that of the British Medical Association, which has tried to discredit the Act and has stimulated and practised objection rather than coöperation. The aggressive attitude of the Minister in charge of the new service has sometimes excused an aggressive response from doctors; but undoubtedly the profession would have had far more influence on the Act, the regulations, and the terms of service if the B.M.A. leaders had preferred creation to obstruction.

This week's plebiscite is held in circumstances quite different from those of February. At that time Mr. BEVAN could fairly be accused of taking too little notice of medical opinion, and it was arguable that a strong expression of dissatisfaction would show the Government how gravely that opinion was disturbed. Believing, as we still believe, that conciliation would bring more concessions than a hostile demonstration, and knowing that if hostility deterred the Minister from making any concessions the profession would stand committed to a damaging conflict, we recommended acceptance of the Act. This policy was not adopted, and those who wish to do so may claim that the Minister's recent change of tone was due to the shock of the plebiscite results, which may thus have proved salutary. They will certainly be mistaken, however, if they go on to suppose that a further negative vote would bring further advances: for such a demonstration would inevitably confirm Mr. BEVAN'S long-held conviction that negotiation with the B.M.A. is useless because every concession leads to a fresh demand, and it would be treated by the Government as a direct challenge to Parliament. Nor, it seems, does the B.M.A. council pretend the contrary. Whereas last time it was really asking for a mandate to negotiate from strength, its chairman declares that it is now asking for a mandate to fight. If the profession follows this lead there are to be no negotiations: "if we have the necessary majority . . ." Dr. DAIN says, "the deal is off." All idea of compromise having been rejected, a campaign will be undertaken which is intended to oblige Parliament to accept "everything we think necessary"—a campaign which must be resisted by everyone who cares for constitutional government.

What then does the B.M.A. "think necessary"? From *The Doctors' Case* published by the association only two or three weeks ago it appeared that the dominant issue was the Minister's personal power to convert general practitioners into whole-time salaried servants of the State; but this power has since been surrendered. Likewise the fear that doctors would be prevented from publishing their opinions has been met by an assurance of complete freedom to do so. The risk of legal muddles over partnerships is being examined by an expert committee, including the two counsel who prepared the B.M.A. case. On the vexed question of so-called negative direction—which is merely the right of the Medical Practices Committee to prohibit fresh entries to the public service in areas where doctors are unnecessarily numerous—the Minister has promised to review the working of the scheme after a couple of years, when we shall know whether it involves any hardship. Of the familiar bones of contention there remain the appeal to the courts and the ownership of goodwill. That every doctor must be allowed to appeal to the courts against the Minister's decision is one of those propositions that sound so convincing on public platforms but prove on closer study to be founded on emotion rather than common sense; for, apart from its legal unsuitability, such appeal would often work to the disadvantage of doctors engaged in the service and would be altogether inferior to the arrangements included in the Act to ensure that they have justice. Which leaves us with the ownership of goodwill—the right to buy and sell practices in the public service—which is still represented as essential to professional freedom. It is remarkable indeed that a custom which is regarded by our Continental colleagues as unethical, and which many doctors here have long deemed a rather regrettable anachronism, should become once more the head of the corner. As a symbol of professional independence it is certainly defensible, and if the Act did not abound in other safeguards of independence we might ourselves defend it. But must the will of Parliament be thwarted, and the profession split from top to bottom, in order to preserve a system that lays an increasingly heavy burden on most of the young men and women entering general practice?

Obviously none of these items in the B.M.A. case is in itself sufficient to justify the extreme step which Dr. DAIN is asking the profession to take. All who pause to consider the risks implicit in any organised service must surely recognise that the freedom of the doctor inside it will not really depend on a clause or two in an Act but rather on the spirit in which it is worked. Judged as a scheme of nationalisation, the National Health Service is something novel and promising, because it gives its members so many chances of infusing the service with their own spirit and contributing their own ideas. That it involves

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dangers and sacrifices none could deny; but for better or worse this country is now going through the disagreeable stages of a social revolution. Who, indeed, would have imagined that a State medical service introduced by a Labour Administration in so perilous a period would prove to be an elaborate and considerate compromise with professional opinion and interests? A Government which has gone so far in compromise is entitled to expect that the representatives of medicine should also aim at agreement rather than the enforcement of "everything we think necessary." If members of a learned profession were to choose direct action at such a time they could no longer complain if others followed their example. Dr. DAIN's call to arms is as wrong as it is rash.

A final choice between the two policies must now be made. On the one hand, the policy of suspicious opposition may be developed into active resistance in the hope of displacing the Minister and perhaps the Government. Before its eventual failure this resistance will have poisoned the relations between doctor and doctor, as indeed the prospect of it is already doing. On the other hand, we can be positive instead of eternally negative; we can accept the fact that 1948 is neither 1938 nor 1913; and we can unite in an effort to make the best of the medical opportunities of a new age. Though partly different, they are at least as great as any in the past.

Streptomycin on Trial

STREPTOMYCIN was isolated in 1944 by WAKSMAN, who recognised its action on the tubercle bacillus; yet only now, more than three years later, are we beginning to see more or less clearly the value and limitations of this drug in the treatment of tuberculous infections. The very nature of these infections has precluded hasty judgment, and investigators have been handicapped by continuing shortage of the drug; moreover, the scanty supply has been spent mostly on small series of cases, with differing criteria of diagnosis and selection, and with varying periods of observation.

In its trial of streptomycin in tuberculous meningitis, the Medical Research Council's special committee set itself to overcome these obstacles to understanding; and its report, published in last week's issue, tells how fully it has succeeded. Of 105 cases, all of which were confirmed bacteriologically or post mortem, 38 (36%) were alive not less than four months after the start of treatment. These over-all figures do not differ greatly from those already published; the American Council on Pharmacy,[1] for example, reported, among 91 cases, 33 (36%) survivors, of whom 20 had been observed for less than four months, while from France come accounts of 26–37% of survivors at four to six months.[2] What distinguishes the M.R.C. results is the unusually high proportion of survivors among those treated with combined intramuscular and intrathecal injections—a success which is probably due to persistence in intrathecal therapy for longer periods than has usually been the practice. Of 72 cases treated in this way, 27 (37%) were alive after seven months or more, and of the 48 aged over three years 22 (46%) were alive. In a parallel group of 28 cases treated with intramuscular injections alone, all 9 of those under three years had died by the end of four months, while 6 (32%) of the other 19 survived. The evidence indicates that with combined therapy between 25% and 40% will survive at the end of six months, and of these survivors the great majority will be in good clinical condition; one of the M.R.C. patients has become mentally defective and another has a serious behaviour disorder, but the remainder are normal or nearly normal. Even with clinical cure, however, persisting abnormality of the cerebrospinal fluid is often a sobering reminder that late relapse is still possible, and late relapses have in fact been reported from the United States. Of 30 M.R.C. cases making good progress last December after at least four months, 3 relapsed and died within the next three months; with the remainder the prognosis remains reserved, but it may be assumed that the relapse-rate will gradually tail off and that the eventual recovery-rate will be not less than 20%. There is every hope, too, that as experience grows, this rate will be rapidly raised. The Oxford figures are given elsewhere in this issue, and there is some indication that the various surgical procedures undertaken at this centre have contributed to its outstandingly good results. There is also reason to believe that better results will be achieved by combining streptomycin treatment with administration of a sulphone. A first report by COCCHI and PASQUINUCCI[3] covers too short a period of observation for any firm conclusion; but LINCOLN and her associates,[4] in a study of 7 patients treated with streptomycin plus 'Promizole,' reported 6 survivors at from three to eight months after the commencement of treatment; all 6 were mentally normal and none had pronounced neurological damage.

The present investigation has confirmed the importance of early treatment, and streptomycin should not be withheld through delay in obtaining bacteriological confirmation of a clinical diagnosis. The trial has shown, too, how much greater is the hazard of tuberculous meningitis in children under three years than in those above this age; of 33 under three, 27 had died four or more months after treatment was started, whereas of 72 older patients only 40 had died. The study has also brought to light the significance of the streptomycin level in the cerebrospinal fluid as a guide to the course of the illness while patients are receiving the drug by intramuscular injection only. As the meningeal process advances, the barrier becomes more permeable and the C.S.F.-streptomycin content rises; this rising level should perhaps be taken as an indication for resuming intrathecal injections. A further index to prognosis is afforded by the results of C.S.F. cultures in the early weeks of the illness, for in cases which ended fatally tubercle bacilli were cultured consistently more often than in those which survived. In contrast with experience in the treatment of pulmonary tuberculosis, streptomycin resistance has been rarely observed in this series; only 3 of the strains isolated from 22 patients between the 29th and 136th days of treatment were resistant. Finally, the Oxford report

1. *J. Amer. med. Ass.* 1947, **135**, 634.
2. *Pr. méd.* Feb. 21, pp. 117–137.
3. Cocchi, C., Pasquinucci, G. *Riv. clin. pediat.* 1947, **45**, 193.
4. Lincoln, E. M., Kirmse, T. W., De Vito, E. *J. Amer. med. Ass.* 1948, **136**, 593.

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this week is a major contribution to knowledge of the mechanical factors in the production of hydrocephalus as part of what has for convenience been termed the "interpeduncular syndrome."

These are among the highlights in a report which has demonstrated once again the virtue of coördination in research. Further valuable information may be expected from the conjoint efforts of centres now operating under the Ministry of Health and the remaining M.R.C. centres.

Under New Management

WITH the coming of spring, the first of the hospital management committees are beginning to show above ground. Their appearance is of general interest, since almost everyone is concerned in some way with the hospitals they will manage. Nor have their characteristics been fully appreciated; for they have been differently portrayed at different stages of the evolution of the National Health Service. When the regional boards were to be non-executive planning bodies, covering large areas, the corollary was that management committees would have much responsibility. When it was argued that, on the contrary, there should be 30 or 40 regional boards actively administering the hospitals, it was reasonable to think of them as little more than house-committees. Mr. BEVAN finally chose to make the regions large while giving the boards executive duties, and as his Bill went through Parliament he was persuaded that with only 14 regions it would be necessary to endow the management committees with more life and importance than he at first intended.

In appointing a management committee, and in deciding what it shall manage, a regional board will ordinarily (one might suppose) be thinking in terms of convenience: a big hospital will naturally need a management committee, and it may be convenient if this takes over one or two neighbouring or associated institutions; or a group of smallish hospitals, not too far apart, may conveniently be placed under single management. But from the dispositions so far announced it looks as though convenience were sometimes rated below another functional aim—the desire that each united group of hospitals should offer a service as complete as that of a large general hospital. This idea of a comprehensive unit integrated under one committee derives from the reports made three or four years ago by the hospital surveyors, who wanted to ensure that the hospitals, without overlapping or wasteful competition, should jointly meet all the ordinary needs of their locality. Since these reports appeared, however, the regional boards have been invented, largely for this very purpose of assigning to each hospital its place in the local and regional scheme; and when the functions of the various hospitals are determined at the regional level there is no longer the same necessity for each management committee to dispose of the resources of a complete service. If this is granted, it follows that the primary duty of the management committees is to manage; and in forming the groups under their control they would be unwise to sacrifice convenience of management to any other aim. Something can be said for comprehensiveness, on the ground that the hospital management committee has to make the detailed arrangements for the work of consultants, both in institutions and in the patient's home. Again, the large unit can be strongly and fairly defended where its object is to prevent isolation of a backward institution which might tend to remain backward unless brought into a group. But (as a correspondent points out in our Reconstruction column this week) where a group is too large for effective management of all its hospitals by the one committee, there is a risk of a three-tiered structure in which this committee becomes a minor regional board and the day-to-day work has to be done by a house-committee. The Ministry of Health, while admitting the need to delegate certain functions to house-committees, is understood to look with disfavour on any general and widespread delegation. Only time can show how far it is avoidable when the group under the committee's control is big or scattered.

The tasks before many of the management committees are formidable, and the method of progress by trial and error will no doubt be widely illustrated in the next few months and years. What is important, however, is that when these few years are over the committees shall be found still to possess the considerable measure of responsibility which the Act accords them. The Government recognise the necessity to maintain and foster the local interest and good will which have done so much for hospitals in the past, and the Minister has made this interest probable by giving the committees enough powers to attract able men and women to their membership. This represents a big advance on his original project, and we doubt whether the advantages potentially enjoyed by the committees have been sufficiently understood. A recent resolution by the medical staff of an important non-teaching hospital suggested that amendment of the Act—

> "... should include greater democratic independence for hospitals, which should have locally elected members on their management committees, be legal entities that can be sued, be permitted to raise money by local and national appeals, and be organised internally like the most efficient of the present voluntary hospitals."

If the requirement of "democratic independence" is satisfied with freedom of action within the limits of an approved budget and an approved general plan, it is attainable under the Act. How the members of the management committee are selected will rest with the regional board, whose object will be to form a well-informed and efficient committee rather than a body of delegates elected by local organisations; but there is no reason to suppose that the boards are going to appoint committees less representative of local feeling and ability than the existing boards of voluntary hospitals, and the committees will have the right to appoint additional outside members to their subcommittees, including house-committees. Under section 13 of the Act the hospital management committee has the legal status demanded, being entitled to enforce rights and incur liabilities; and under section 59 it can accept, hold, and administer any property upon trust for purposes relating to hospital services or to its own functions. As for organising hospitals internally "like the most efficient of the present voluntary hospitals," that will

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be for each committee to decide for itself. There are various ways of organising a hospital, and it would be a pity to insist on uniformity; but so far as medical staffing is concerned the hierarchical system is in retreat, and if the profession so wishes this retreat could become a rout. Every hospital management committee will, like the board of a voluntary hospital, be advised by a medical staff committee, and there should be ample opportunity for bringing light to such as (for one reason or another) sit in darkness and shadow.

Annotations

PINK DISEASE

THE cause and cure of pink disease have interested many minds, fruitlessly. Now it is said that Warkany and Hubbard, of Cincinnati, have found mercury in the urine of each of 5 infants with this disorder, none being present in the urine of 17 controls. This led Bivings and Lewis [1] to treat a case with BAL, and they state that mercury disappeared from the urine in nineteen days, though recovery was no more rapid than it sometimes is with other treatment or with none.

Sweating, salivation, stomatitis, loss of weight, weakness, and psychic changes are common to pink disease and to chronic mercurialism in the adult; and infants are often given mercury as grey powder or calomel. The mothers of 10 children suffering from pink disease were questioned in London recently and in each case it was found that the child had had "teething powders," which generally contain calomel (or sometimes pulv. hydrarg. cum cret.) in considerable quantities. In 2 of these cases the urine was examined and was found to contain mercury, and three weeks after treatment with BAL in amounts corresponding to the American dosage one of the children still had pink disease, while the other was convalescent.

There is thus a case for investigation, but to prove mercury's guilt will be difficult. Thousands of children are given teething-powders, and few develop pink disease. It may be that mercury will be found more often in the urine of children with pink disease than others, but fretful, teething children are given powders, and babies with pink disease are babies who are teething and very fretful, and are correspondingly likely to be dosed. If mercury is indeed the cause, BAL may be expected to have a curative effect, but in so variable a disease results of treatment are unusually hard to assess. The failure of BAL to cure rapidly would not acquit mercury, for ingestion has commonly continued for weeks, and poisoned tissues may take some time to recover. None the less, an attempt should be made to discover whether this miserable condition, which exhausts child and mother, is in fact produced by druggists, doctors, and old wives.

THE OLD

> "In considering the physical state of the old people, one of the dominant impressions formed during the survey was of their almost incredible determination and 'guts.' They virtually never struck their flag in the face of physical defects that as a younger individual one would have thought were impossible to override, but made the best of things and kept going as well as they could."

Dr. J. H. Sheldon's medical survey [2] of old people, published last Saturday by the Nuffield Foundation, is the complement of the Rowntree committee's social survey.[3] Indeed it has embraced some of the same old people, for Wolverhampton, where it was made, was among the towns studied by the committee, and the same random sample was used for this one. The list was obtained by taking every 30th name on the Wolverhampton register of ration-cards and following up every man born before 1879 and every woman born before 1884. In this way the names of 583 old people—186 men over sixty-five, and 397 women over sixty—were collected; and a questionary was completed for 477 of these. Some of the findings which struck Dr. Sheldon as specially interesting were set out in his Holme lecture, which appears at the front of this issue. It will be noticed that whereas the style of the social survey was detached and impersonal, the medical survey is as human and moving as it is scientific. In paying his visits to these old people in their homes, Dr. Sheldon has admired them and enjoyed their talk, and this direct feeling for his subject constantly enlivens his text, and informs the "random reflections" with which the book ends. It needs this leaven, for the facts are often sad. He confirms the findings of other observers, including Prof. Thomas Ferguson,[4] that many old people are living under conditions which are too hard for them, troubled by disorders which have not been sufficiently studied; and that some younger people are giving too much of their health and strength and too many of their years to tending their elderly kin. But his report is far from being a mere repetition of others; it opens up new lines of research, and sheds new light on the case of the old person living alone.

General health was surprisingly good among some 450 old people who replied to questions on this point. Only 29% were under treatment at the time of Dr. Sheldon's visit, and though some 44% had needed medical help during the last three years, over a quarter had not called in the doctor in that time, and some had hardly ever needed one in their lives. Answers from 471 showed that, while two-thirds had retained their ability to get about, the remaining third had some limitation of movement, though only 2·5% were bed-fast. Quite apart from such physical factors as arthritis, bad legs, or labyrinthine vertigo the mobility of the old is often restricted, he found, by fear of traffic. Nor is this fear misplaced. When you do not move fast, even at your best pace, when you know you are deaf to the sound of a distant horn, when a sudden turn of your head brings on vertigo, when you are given to unforeseen tumbles, you are wise to distrust the modern road, even when this means that you cannot cross it to buy your food. Dr. Sheldon thinks it would be worth inquiring further into the liability to fall. Some falls result from labyrinthine disorder; others from failure to lift the feet high enough; and others again from a sudden loss of tone in the muscles, probably due to involutional changes in the nervous centres responsible for posture.

Aids to failing organs and faculties are poorly distributed. Spectacles are often accepted as a gift from a friend, or inherited from a forbear or crony, with the result that they seldom suit the wearer, and are sometimes positively harmful. Though deafness of some degree was found in about a third of the sample, hearing-aids were rare, and when owned were seldom used. A good sight-testing service, and the provision of spectacles and well-designed hearing-aids should make a great difference, Dr. Sheldon believes. Artificial teeth are often worn only for show, not for eating, and many old people told him that they chewed almost as well with their gums as they used to do with their teeth. He gained some new facts about diet, notably that, despite the nursery rhyme, old men are often avid for meat fat, while their wives prefer the lean.

A study of the mental state was difficult to make in an investigation of this kind, since few people are willing

1. Bivings, L., Lewis, G. jun. *J. Pediat.* 1948, **32**, 63.
2. The Social Medicine of Old Age. Pp. 239. 5*s*.
3. Old People. 1947. See *Lancet*, 1947, i, pp. 105 and 113. Both reports are published for the trustees of the Nuffield Foundation by the Oxford University Press, London.
4. *Lancet*, March 13, p. 417.

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—or indeed able—to reply accurately to questions about their manners and habits, though they are ready enough to talk about their mood, their memory, and their occupations. Dr. Sheldon concluded, however, that 11% of the sample had slight impairment of mental faculties, shown by apathy, depression, and failure of memory, while about 4% had a more severe degree, being either forgetful and childish, or demented and very difficult to live with. A still smaller proportion (0·8%) had deteriorated sufficiently to be certifiable, and there were a few "eccentrics" who were solitary, independent, and aggressive—like the old bull that roams by himself.

What comes out clearly, however, is that many old people apparently living alone are in fact part of the family group. Arrangements by which a daughter lives next door, or members of the family look in daily, or the old person spends his days at a relative's house and only sleeps at home, not only spare the independence of the old, but safeguard the young and their families against some minor strains and irritations. Dr. Sheldon proposes an experiment in a new type of house—an ordinary house inhabited by a married son or daughter, with a smaller house attached for the old people. He also urges the necessity of providing domestic help for the many young people who have to bear excessive strain in looking after elderly dependants, and for hostels where the old could be happily placed while these younger people take the holidays they so badly need.

MINUTIÆ AND MEASUREMENT IN CANCER RESEARCH

LARGELY as a result of previous American work on the relation of the ovaries to mammary cancer and on the breeding of homozygous strains in mice, the main facts about hereditary mammary tumours in mice were established between 1936 and 1941. But there were still discrepancies and gaps in our knowledge, and one of the most interesting is disclosed in the annual report of the Imperial Cancer Research Fund.[1]

An agent having the general characters of a virus is indispensable for the occurrence and transmission of these hereditary mammary tumours. Since this agent is passed from one generation to the next in the mother's milk, it was naturally supposed that clotted milk derived from the stomachs of the suckling mice would contain it. However, Dr. R. J. Ludford found that milk thus derived did not induce tumours in young susceptible hybrid mice into which it was injected at the proper time. His finding is not completely beyond criticism, since the susceptible mice used for the test were not themselves proven for susceptibility by injecting littermates with agent from a source known to contain it; but the negative result has now assumed additional importance. Electron-microscope studies of milk from the stomachs of young mice have revealed the presence of very numerous small particles similar to those found in tumour extracts,[2 3] and, though the authors do not claim it, the presumption is that these particles represent or indicate the presence of the infective agent. If Dr. Ludford's finding in the Imperial Cancer Research Fund's laboratory is confirmed by the missing control experiment, the corollary, as he has pointed out,[4] will be that these particles may still represent the agent even if tumours cannot be obtained from the material containing them. Meanwhile Dr. A. M. Begg has found that intranasal instillation is an effective means of inducing mammary tumours in suitable mice; so the actual path of infection may be through the nasal lymphatic channels rather than through the alimentary canal.

Susceptibility to the agent is indispensable for its activation, but the exact nature of this susceptibility still eludes us. It is always present in high cancer lines and also in a variable proportion of mice of some sublines of those strains that are classed as resistant. Incidences ranging from 20% to 63% have been recorded in the usually resistant C 57 black line when their young have been fostered by high-cancer-line mothers. It appears also that the agent is sometimes carried by this strain, and in the present report an incidence of about 12% in hybrids having C 57 black mothers is recorded by Dr. L. Foulds. The third indispensable for growth of these hereditary mammary tumours is the œstrogenic hormone. Its action is partly to enable the virus or agent to become active; though we do not know how. Thereafter, Dr. Foulds has shown it may have a promotor action resembling that of chemical substances.[5] Its absence from males and castrate females retards growth of some transplantable tumours, and when supplied it stimulates them. There is a suggestion here of an experimental counterpart of clinical observations on the regulation of certain tumours by hormones.

It is of particular interest to read that successful attempts have been made by Dr. James Craigie, F.R.S., to preserve tumour material in the frozen state. This method offers scope for the standardisation of yet another of the raw materials of cancer research; and it is standardisation and measurement that lead to rapid progress once the original discoveries have been made. Thanks to the labours of E. L. Kennaway and J. W. Cook and their collaborators, we now have pure synthetic carcinogenic chemicals with constant biological properties, and it may in future be possible to measure the tumour-initiating action of a single measured dose of any of these, and the time (which appears to be brief) required by them to make an irreversible malignant change.[4] In the field of tumour viruses, the agent and the genetic basis of susceptibility, when this is involved, can all be measured in some degree. Hormones, which have so deep-seated a relation to tumour pathology, can also be assessed. All these aspects of cancer research are receiving attention at the Imperial Cancer Research Fund's laboratories.

SPASTICS TO THE FORE

THERE is nothing better than a good conference for letting light into dark places; and the illumination was steady at the one-day conference on the medical, educational, and social aspects of the cerebral palsy problem, held in London last week under the auspices of the British Council for the Welfare of Spastics. Why the victims of Little's disease have been allowed to linger so long in greater darkness than the blind is a question that can be left to social pathologists. What matters is that among the relative scotomata in our social vision, this one is now clearing up.

Is the treatment of cerebral paretics worth while? That question was asked by several speakers and answered affirmatively, on humanitarian grounds by some and on economic grounds by others. A historian might have by-passed the point, as being of merely academic interest; for at least it can be said of us nationally that whenever we have been made to face squarely the case of any lame dog, *something* has been done about it. What cannot be forecast is whether the job will be done decently, or whether we will make the kind of unimaginative face-saving gestures which the Curtis Committee exposed. It is just possible that the delay in giving these children a fuller life may work to their ultimate benefit: for today we are in a mood, as never before, to give orders for that extra ha'porth of

1. Forty-fifth Annual Report of the Imperial Cancer Research Fund, 1947–48. Presented at the annual general meeting on April 21. Obtainable from the Fund's office at the Royal College of Surgeons, Lincoln's Inn Fields, London, W.C.2.
2. Passey, R. D., Dmochowski, L., Astbury, W. T., Reed, R. *Nature, Lond.* 1947, **160**, 565.
3. *Lancet*, 1947, ii, 835.
4. Society of Pathology and Bacteriology: January meeting.
5. See *Lancet*, April 10, p. 561.

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tar which will mean so much to the young spastic. It may even be an investment, reducing his subsequent calls on the National Insurance funds.

Cerebral paretics the world over will always owe a debt to Dr. Winthrop Phelps and Dr. Earl R. Carlson, but the methods of attacking the problem and the estimation of its size which they have worked out for America may or may not prove apposite elsewhere. If the American figures are even approximately applicable to this country, then the eighteen-month-old British Council for the Welfare of Spastics has taken on a difficult task, for it would seem that something like two dozen battalions of children with this form of handicap are waiting to be assessed, trained, and equipped. Fortunately the council has an assurance of the warmest support from the Minister of Education personally and from his department, and it cannot be doubted that this is the kind of problem to attract the sympathetic interest of the new regional hospital boards.

At a meeting of the section of physical medicine of the Royal Society of Medicine, held on the same day, Dr. P. R. Evans pointed out that the British Council for the Welfare of Spastics is as much concerned with athetoid as with spastic children. The term "athetoid quadriplegia" is used by some orthopædists though it horrifies many neurologists, not to mention scholars. By "diplegia" one writer may mean paralysis of two limbs, while another means paralysis of four. A diplegia is more than twice a monoplegia, and a monoplegia is only half as extensive as a hemiplegia. Attainment of standard nomenclature so far as distribution of the paralysis is concerned should not be hard, but agreement will less readily be obtained in the diagnosis of conditions associated with athetosis. As Dr. Evans remarked, the names are important, for clinical classification must precede ætiological analysis. Little's disease is not one condition but a group.

At the same meeting Dr. J. H. Crosland discussed the methods of treatment and emphasised the need for all concerned, "from the porter to the person in charge of it all," to work as a team. A bit of speech therapy here, a lesson in drinking there, and a little physiotherapy when the mother can manage to get the crippled child to the department will not produce the best results. The different techniques must be integrated appropriately for each individual patient.

THE FIRST TWO YEARS

PARENTS puzzled by the apparently irrational behaviour of their youngest children may turn for enlightenment to Dr. Benjamin Spock.[1] In explaining early vagaries, he champions the infant with the forthright vigour of a prophet. First, he condemns the enforced isolation of the mother from her newborn child, by which she comes to feel that "she is of little importance to her baby and that its care can be entrusted only to medical experts"; and he commends the practice of keeping the crib in the mother's room "so that she can become familiar with his noises, moods, movements and appetite, and so that she can feed him on the breast when he is hungry, rather than according to the clock." Babies know when they need feeding, and if given a free rein they soon work themselves into a regular routine; but as Spock says, a less forbidding title for this practice than "the self-demand schedule" will have to be found.

The commonest problems during the first year are those of feeding; and these may be initiated soon after birth by arbitrary insistence on a prescribed formula. "The baby who, every time he falls asleep satisfied, gets the soles of his feet snapped and the nipple stirred vigorously in his mouth begins to lose his enthusiasm for food and to become balky and irritable"; and the end-result may be personality changes in both child and mother. The risk of feeding rebellion is greater when solid foods are first started, for most infants at first doubt the virtues of the new régime; and the minority of babies who do not subdue this scepticism may enlarge the battle-front by refusing even liquid nourishment. Attempts at forced weaning for which the baby is not ready "often cause bad feeling." Most infants who are nursing at both breast and bottle show their ignorance of nutrition in a preference for the bottle. On the other hand, the baby who has been entirely breast-fed for the first few months is likely, if the breast supply is plentiful, to object urgently to letting a rubber nipple pass his lips. At about nine months infants commonly oppose attempts to supplant bottle by cup; they "bat the cup away suspiciously or, pretending they have forgotten what to do, let all the milk run down the sides of the chin." This derives from a developing shrewdness which warns the child that the bottle may soon be withdrawn; and forced withdrawal has unhappy results. Surprisingly to the uninitiated, the breast-fed baby rarely balks at weaning from breast to cup. There are two reasons for this: first, breast and cup are less similar than bottle and cup, and "it is the shift to something similar that an opinionated baby resists in weaning"; the second reason is that at nine months the baby wants to be done with dependence. He wants to sit up for his spoon-feeding or, if bottle-fed, to take the bottle from his mother's hand and drain the contents while sitting bolt upright.

The second year calls on the parent for fresh resources. Automatic coöperation in the child gives way to a phase of intense exploration, which is assisted by new-found independent locomotion. "He senses he is a separate person, entitled to wishes and a will of his own. He early learns to say 'No' and uses it on all occasions." In becoming more independent, he also becomes aware of his dependence; and thus he may begin to cry each time his mother leaves the room. His wilfulness is commonly expressed in choosiness at meals; and here, Spock warns us, temporary dislikes are easily turned into permanent hates by rigid adherence to a balanced diet. Equal tact is required in dealing with a recalcitrant bowel. "It is the child who is naturally irregular whose mother is tempted to put him on too often and to insist that he stay on too long"; resistance is keenest in those babies who have had painfully hard motions, and ill-judged insistence increases the child's obstinancy, anxiety, and guiltiness. Training should perhaps be deferred until towards the end of the second year.

To many parents Dr. Spock's opinions will smack of dangerous heterodoxy. In the nursery tradition dies hard: whatever the rights of the case, most parents will defend to the last ditch their rigid time-table for feeding and other functions; and they are not likely to abandon lightly a wavering authority in trying to contain their infants' swelling ego.

THE DEATH PENALTY

WE trust that the House of Lords will endorse the Commons' decision to discontinue the death penalty for an experimental period of five years. The arguments for and against capital punishment are too familiar to need restatement, but it will always be impossible to weigh them accurately until the deterrent effect of execution has been measured against that of other penalties under the particular conditions of our own country. As a scientist the doctor will support such a test, and as a humanist he will hope that the result may justify discontinuance of a revolting practice. Two wars have done much to make us callous, and it is heartening to see this small but significant effort to resume the task of making our society more civilised.

1. Spock, B. *J. Amer. med. Ass.* March 20, p. 811.

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Reconstruction

HOSPITAL MANAGEMENT COMMITTEES

FROM A CORRESPONDENT

THE National Health Service Act provides that:

"Every regional hospital board shall, within such period as the Minister may by direction specify, submit to the Minister a scheme for the appointment by them of committees, to be called hospital management committees, for the purpose of exercising functions with respect to the management and control of individual hospitals or groups of hospitals, other than teaching hospitals, providing hospital and specialist services in the area of the board."

"It shall be the duty of the hospital management committee of any hospital or group of hospitals, subject to and in accordance with regulations and such directions as may be given by the Minister or the regional hospital board, to control and manage that hospital or group of hospitals on behalf of the board, and for that purpose to exercise on behalf of the board such of the functions of the board relating to that hospital or group of hospitals as may be prescribed."

When the Act was before Parliament vigorous representations were made for amendments which would secure real independence for the hospital management committees. The fear then was that the idea of regional control might be pressed too far, with the result that the management committees would be little more than agents of the board, deprived of any real responsibility for the control of their hospitals. The emphasis has now shifted, and there seems to be a danger of the hospital management committee becoming, in practice, a minor regional board, itself controlling a whole group of hospitals. Thus the following are examples of large groups placed under single committees by the South-East Metropolitan regional board:

Bromley and Farnborough.—Bromley and District Hospital; Farnborough County Hospital; Beckenham Hospital, S.E.; Hospital for Children (Norwood); West Kent Isolation Hospital and West Kent Smallpox Hospital; Beckenham and Penge Maternity Hospital; Children's Heart Home (West Wickham); Sydenham Invalid Babies' Nursery; Tuberculosis Dispensaries at Bromley, Beckenham, and Penge.

Dartford.—Dartford County Hospital; Livingstone Hospital; Joyce Green Hospital; Bow Arrow Hospital; Long Reach Hospital; Southern Hospital (Dartford); Maternity Hospital (Horton Kirby); Tuberculosis Dispensary.

The danger lies in creating yet another tier of officialdom with which those who really run the hospital will have to battle.

The experience of the voluntary hospitals has long shown that the life and vigour of a hospital depends on the interest taken in its affairs by its own committee. With groups as large as those arranged by the South-East Metropolitan regional board it is unlikely that the hospital will look upon the hospital management committee as its own committee, and powers of independent action will have to be delegated to the house-committee of each hospital. Yet the aim should be to make the hospitals "group minded"; otherwise the advantages expected to accrue from grouping will be unlikely to materialise.

In this connexion the relation between the management committee and its key hospital may need to be watched with care. If the management committee meets at, and controls, its key unit, will the others get their due share of attention? But if, on the other hand, the management committee is separated from the key unit, meets on neutral territory, and has its own sectional organisation, may not its personnel rapidly get out of touch with the real everyday problems of a hospital and become blue-print planners, with the result that the hospitals will find that they have lost badly in the exchange? The balance of advantage certainly seems to lie with the close identification of the management committee with the key unit, which should stand in the position of an elder brother to its associated units, which would largely be left to run their own affairs.

MEMBERSHIP OF THE COMMITTEE

The Act says that the hospital management committee shall be appointed by the regional hospital board and that its members shall include:

(*a*) Persons appointed after consultation with any local health authority whose area comprises the area or any part of the area served by the hospital or group.

(*b*) Persons appointed after consultation with any executive council whose area comprises the area or any part of the area served by the hospital or group.

(*c*) Persons appointed after consultation with the senior medical and dental staff employed at the hospital or the hospitals of the group.

(*d*) Persons appointed after consultation with such other organisations as appear to the board to be concerned.

In the case of a committee appointed before the appointed day for a voluntary hospital or for a group comprising any voluntary hospital, the original members of the committee shall also include persons appointed after consultation with the governing body of any voluntary hospital concerned.

The members of the hospital management committees are now being selected by the regional boards, and it is important that this listing of the bodies to be represented should not obscure the need to keep these various interests in their proper place. The primary requirement for a management committee is the same as for a lay board—that is, men and women who can work happily together and who can develop a strong corporate sense—and the whole object would be largely defeated if this core of lay personnel was swamped by persons appointed to be representative of this and that interest.

This requirement has somehow to be reconciled with the necessity of having the full benefit of expert advice and inspiration from the medical and other professional staff, and the question arises whether the board should select a number of doctors as permanent members of the hospital management committee. As free agents, such doctors would be in a position to identify themselves with the board as a whole, but they would be in a somewhat anomalous position if at the same time they were expected to serve as experts and to speak on behalf of their professional colleagues. Experience suggests that it is essential for the views of the medical staff of a hospital to be brought forward through a medical committee, and in practice it would be a convenience if the chairman and secretary of that committee were given seats on the hospital management committee. Rather than rely on the opinions of members who happen to be doctors, the committee should have the considered view of the medical staff of the hospital. This procedure has the advantage (*a*) of ensuring that the lay board is not troubled with the internal and unresolved differences between members of the medical staff, and (*b*) of ensuring participation of all the members of the senior medical staff in discussions of policy.

Let us hope that the boards will so choose the new management committees as to carry on a tradition that has proved its worth in the voluntary hospitals. Let them make sure of a strong lay hospital management committee and a strong medical advisory committee with its appropriate means of liaison between the two. Let there be also a nursing advisory committee and other committees if need be: but let us hope that they will not confuse the issue and create on the hospital management committee a mixed bag of "representative" persons no more capable of running a hospital than of managing an ordinary commercial concern.

This country has led the world in evolving a traditional relationship between the various interests which is well understood in many a hospital up and down the land today. Fortunately there is nothing in the Act or in its schedules that is inconsistent with it, provided they are interpreted aright.

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Special Articles

MIDWIFERY FEES

IN the Medical Practitioners (Fees) Regulations, 1948, the Minister of Health has set out the following revised scale of fees payable to medical practitioners called in by midwives. These revised fees, which have been under negotiation now for some months, came into operation on April 18. The fees suggested are approximately 50% higher than those at present in force. Special provision is now also made for the reimbursement of the doctor should he have to use for mother or child certain specified expensive drugs.

1. Fee for all attendances from the commencement of labour until the child is born, whether or not operative assistance is involved, including subsequent visits to mother and/or child during the first fourteen days inclusive of the day of birth, and including also a postnatal examination at or about the sixth week after the birth, except where owing to circumstances beyond his control the practitioner cannot undertake such examination, £4 14*s*. 6*d*.

2. Fee for all or any of the following—version in labour, removal of adherent or retained placenta, exploration of the uterus, treatment of postpartum hæmorrhage, or any operative emergency arising directly from parturition, including subsequent visits during the first fourteen days inclusive of the day of birth, and including also a postnatal examination at or about the sixth week after the birth, except where owing to circumstances beyond his control the practitioner cannot undertake such examination—£4 14*s*. 6*d*. A fee shall not be payable under this paragraph when a fee under paragraph 1 is payable.

3. Fee for a single attendance only, either during the period from the commencement of labour until the child is born (whether or not operative assistance is involved) or for any of the purposes mentioned in paragraph 2, £2 12*s*. 6*d*. A fee shall not be payable under this paragraph when a fee under paragraph 1 or 2 is payable.

4. Fee for either (*a*) suturing the perineum or (*b*) resuscitation of baby, £3 3*s*.: provided that where only one attendance is made a fee of £2 12*s*. 6*d*. shall be payable in lieu of the fee of £3 3*s*. A fee shall not be payable under this paragraph when a fee under paragraphs 1 to 3 is payable.

5. Fee for induction of labour, whether or not more than one visit is involved, £2 12*s*. 6*d*. A fee shall not be payable under this paragraph when a fee under paragraphs 1 to 4 is payable.

6. Fee for attendance at, or in connexion with, an abortion, miscarriage, or threatened abortion or antepartum hæmorrhage after the 28th week of pregnancy, including all visits in respect of such attendance during the fourteen days from and including the first visit, £4 4*s*.: provided that where only one attendance is made a fee of £2 12*s*. 6*d*. shall be paid in lieu of the fee of £4 4*s*.

7. Fee for attendance of a second medical practitioner to give an anæsthetic, whether on the occurrence of abortion or miscarriage, at parturition, or subsequently, £1 15*s*.

8. Fee for visits to mother and/or child not included under paragraphs 1 to 6: day (9 A.M. to 8 P.M.), first visit 12*s*. 6*d*., subsequent visit 10*s*. 6*d*.; night (8 P.M. to 9 A.M.), £1 1*s*.

9. The usual mileage fee of the district to be paid for all attendances under paragraphs 1 to 8: provided that one mileage fee only shall be paid in respect of one journey, whether such journey shall have been made for visiting one, or more than one, patient.

10. Fee for attendance on mother or child at the medical practitioner's residence or surgery, 5*s*.

11. The appropriate fee as prescribed above shall be increased by the amount of any reasonable expenses necessarily incurred by the practitioner in supplying any of the following drugs or preparations, where such a drug or preparation is essential for the proper treatment of the mother or her child: carbon dioxide, ergometrine, lobeline, liver extract and injections of liver, methylamphetamine, oxygen, penicillin preparations, pethidine, sex hormones, sulphonamide preparations, vasopressin, vitamin B_1 complex, vitamin K.

HEALTH SERVICE IN NORTHERN IRELAND

THE Health Services Bill (Northern Ireland), which was introduced towards the end of last year,[1] has now been enacted; and last week the General Health Services Board and the Hospitals Authority, which has been set up under the Act, met for the first time. These two bodies have the following medical members:

General Health Services Board.—Mr. S. T. Irwin (vice-chairman), Dr. J. H. P. Giff, Dr. R. E. Hadden, Dr. Cecil Kidd, Dr. M. F. Leslie, Dr. J. A. McVicker, Dr. P. V. Pritchard, Dr. J. C. Smyth, and Dr. R. J. Spence.

Hospitals Authority.—Dr. F. P. Montgomery (chairman), Dr. F. M. B. Allen, Prof. J. H. Biggart, Dr. W. F. Bryson, Mr. A. M. Calder, Dr. Muriel J. L. Frazer, Dr. N. B. Graham, Dr. T. A. Kean, Mr. H. I. McClure, Prof. W. W. D. Thomson, Mr. J. R. Wheeler, and Mr. C. J. A. Woodside.

The duties of the General Health Services Board correspond with those of the local executive councils under the English and Scottish Acts, while the Hospitals Authority has functions similar to those of the various regional boards in England and Scotland. Speaking at a luncheon given last week by Mr. William Grant, minister of health and local government, Dr. Montgomery pointed out that there could be no immediate or drastic change in the provision of hospital accommodation; the further 4000–5000 hospital beds needed in Northern Ireland would have to be slowly built up.

Medicine and the Law

An Unexplained Death

IMPORTANT issues are raised by a letter we have received from a doctor whose child died in hospital. Here are some of the facts as he gives them.

His wife, having been delivered of a child in the private maternity ward of a voluntary hospital, is due to return home with her baby when at 6 A.M. she is told by the house-surgeon that the baby has been found dead; it is suggested that the baby vomited during sleep and choked. Ten minutes later she goes toward the nursery to see the child but is persuaded by the house-surgeon (who has been consulted by the nursing staff) that it would be better not to proceed as the child is "all blue." The day sister, after expressing the opinion that the babies were possibly "kept too warm," assures the mother that her child is the only baby found dead. The father of the child (our correspondent) is informed, three hours after the mother's urgent request; the news comes not from the house-surgeon or the hospital but from the private rooms of the honorary surgeon. At the hospital the father is told that the cause of death is unknown and cannot be known. The parents are, at their most pressing request, shown the dead child: the face alone is visible; it is unmarked. Two days later the father is notified by the coroner's officer that an inquest will be held next day on the death of the child and of the other child who died with her. At the inquest the theory of a painless death due to heat-stroke is put forward. This theory, according to our correspondent's letter, was not supported by the pathologist's evidence. The parents asked the hospital for an inquiry, with evidence on oath, the finding to be published in the medical press if they so desired, and all their common rights to be reserved, whatever the finding. The hospital offered instead an inquiry before its own nominee, evidence not to be on oath, the finding not to be published in the medical press, and the parents' legal rights to be surrendered. An appeal to the Ministry of Health received a sympathetic reply but all power to bring pressure to bear upon a voluntary hospital was disclaimed. It was still possible to bring an action for negligence in the civil courts. The defendants, however, paid into court, with a denial of liability, a sum of money sufficient to satisfy such amount of damages as was likely, in view of decisions of the House of Lords, to be awarded for the loss of expectation of life in the case of a dead infant. The parents, whose quarrel was with a

1. See *Lancet*, 1947, ii, 630.

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hospital, not with an insurance company, were advised that a continuance of the action would be fruitless; the only question would be a question of damages.

Out of this distressing case our correspondent contends that three questions arise. First, what are the standards of hospital administration in such a matter? In the world of insurance an insured person is warned by his insurance company to make no statement which may seem to be an admission of liability. Ought a hospital to adopt a similar course? Secondly, is the coroner's inquiry any adequate safeguard? The house-surgeon, the only qualified practitioner present at or immediately after the baby's death, was not called as a witness. Thirdly, our correspondent asks, how far does the present system of defence insurance conduce to the ends of justice? Briefly the answer to this last question is that without insurance or some such arrangements not only would the doctor be left open to malicious charges, and have to bear the expense of defending himself against them, but the patient might well be left without due satisfaction of his just and awarded claim, for many doctors are financially unable to pay big damages. It is open to any defendant to settle a claim, either by negotiation or by payment into court of a sum which the plaintiff may be attracted to take out; but there is nothing to stop a plaintiff, whether he accepts the settlement or not, from publishing details of that settlement or of his action if it continues into court.

Public Health

Allowances for the Tuberculous

IT is a weakness of our present system of providing for the tuberculous that scales of allowances vary widely in different parts of the country and under different authorities. The rates in some areas are so low as to entail serious hardship for the sick person, especially if he is living alone. A striking case of the kind has lately been brought to our notice.

A State-certified midwife, who had spent ten years as a patient in a sanatorium, was discharged in 1936, and for a time was able to take work of various kinds—all as it happened poorly paid, and much of it too heavy for her good. Finally, becoming too ill to work, she applied for public assistance. She is now living in a seaside town, where the social-welfare allowance is 24*s.* a week plus an allowance of 4*s.* a week for coal from October to April. Her rent is 9*s.*, which leaves her with 15*s.* for food and all other necessities. She is allowed two pints of milk daily on a priority certificate, and one of these pints is free; the other daily pint she must buy at a cost of 2*s.* 11*d.* a week. Out of the remaining 12*s.* 1*d.* of her allowance she has to buy food, cleaning materials, and oil for cooking and lighting, and must pay for clothes and boot repairs. There is no bath at her lodgings, but she can get a bath for 4*d.* in a neighbouring part of the town, a 2*d.* bus-ride away.

This allowance—the full cash allowance for the area—compares badly with that paid in London and many other parts of the country. The only other resource open to her is to apply to the welfare officer for "special assistance," when her application would be considered by his committee.

In London she would receive 18*s.* maintenance, her rent of 9*s.*, a coal allowance of 5*s.* during the winter months, and an extra allowance of 7*s.* 6*d.* for extra nourishment because she is tuberculous: making a total of 39*s.* 6*d.*

Clearly it is impossible in these days to maintain a reasonable standard of nutrition on an income of 24*s.* a week plus a free pint of milk daily; and no-one should be obliged to apply for "special" help when his bare needs are not being met. In any case, many people, fearing a rebuff, are unwilling to apply for special help, even when their need is great.

Presumably such anomalies will disappear when the National Assistance Bill becomes law. Special arrangements are being made for tuberculous patients, and it is to be hoped that such niggardly scales of assistance as the one mentioned here will not be perpetuated.

In England Now

A Running Commentary by Peripatetic Correspondents

ON an ocean-clad island 5000 miles from the metropolis, political wranglings, whether of Mr. Bevin and Mr. Molotov or of Mr. Bevan and the B.M.A., seem not only remote but, very soon, singularly unimportant. Moreover enthusiasm for matters medical is almost entirely sapped by the abominable good health (except for sunburn, an endemic disease) of the men under my care; so it is only among the natives that one finds anything worthy of scientific comment. The island being entirely devoid of vegetation, they live exclusively on fish and goat's milk, and in consequence suffer in one way or another from malnutrition, in particular from scurvy of a degree found elsewhere only in text-books. Leprosy, dysentery, and tuberculosis combine to add to their miseries. Towards the end of March the mail arrived containing no fewer than fifteen medical journals and two plebiscite papers. The journals were rather hard and shiny, but the plebiscite papers made excellent goat fodder. I like to think that perhaps they helped to produce another ounce or two of nutritious milk.

* * *

The trouble with me, and possibly with many other doctors who felt that they were doing as much honest work as the rest of the community, is that under the influence of continuous propaganda we are beginning to wonder whether our way of life is not despicable after all. Everything we do is held up to ridicule and contempt. I have worked myself nearly to a standstill trying to do far too much in a voluntary hospital, but it now appears that the only people who do anything creditable are those on a whole-time salary. Any pleasure that I might derive from the fact that my practice has increased $5^1/_2$ times is destroyed by the gospel that success in private practice merely indicates a good bedside manner, and no efficient doctor would sink so low as to acquire this; it is much more honest and sympathetic to be rude to patients. If I buy additional or modern apparatus, this only gives me a "vested interest in disease"—analogous, no doubt, to buying packets of tubercle bacilli to be scattered at regular intervals in the waiting-room. Having been fortunate enough to be appointed to the hospital staff at an open election, I bought my predecessor's practice, so that no-one could say that I had defrauded the widow, and so that there should be no argument as to what had happened to his practice and records. But I am now informed that I have bought the bodies of several hundred thousand prospective patients. This seems slightly ludicrous at 0·14*d.* per body, or seven bodies a penny, especially as these bodies have apparently already been purchased by the general practitioners.

But this is not all. I have other failings which make it almost impossible for decent men to speak to me. As the result of industry a little above the average, I managed to buy the house which contained my plant and practice, and also the one in which my family live, having lost all our possessions in a blitz. This makes me a capitalist. It would have been far better to have spent the money on drink or racing (although here I am in a quandary because savings since 1945 are faintly respectable). Also I am an employer, which by definition puts me into the antisocial category. In fact, so much scorn has been poured on all the things that I have believed in and worked for, that I have little further pleasure or interest in my hospital or private work; and if I could think of some other method of earning my children's school fees I should certainly adopt it. . . . Alternatively perhaps I should feel better after six months' holiday.

* * *

The recent account of atriplex poisoning in Dresden brings to my mind the following description, quoted by Hughes and Clark (1939), of some cases of *Datura* (*Stramonium*) poisoning which occurred in 1676.

"This being an early plant, was gather'd very young for a boil'd salad, by some of the Soldiers sent thither,

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to pacifie the troubles of Bacon; and some of them ate plentifully of it, the effect of which was a very pleasant Comedy; for they turned natural Fools upon it for several Days. One would blow a Feather in the Air; another would dart straws at it with much Fury; and another stark naked was sitting up in a Corner, like a Monkey grinning and making Mows at them; a Fourth would fondly kiss and paw his Companions, and snear in their Faces with a Countenance more antik than any in a Dutch Droll. In this frantik Condition they were confined, lest they in their Folly should destroy themselves; though it was observed that all their Actions were full of Innocence and Good Nature. Indeed, they were not very cleanly; for they would have wallow'd in their own Excrements, if they had not been prevented. A Thousand such simple Tricks, they play'd and after Eleven Days, return'd themselves again, not remembering anything that had passed."

Morton (1939) quotes an early clinician, who describes a man suffering from belladonna poisoning as being "hot as a hare, blind as a bat, dry as a bone, red as a beet, and mad as a hen." This seems to put the matter in a nutshell!

* * *

I read with interest the conversation—probably not so imaginary—of the Professor, Clinician, and Traveller (March 13). Though they were talking about the Colonies their remarks illustrate vividly a problem which faces all of us in this large and progressive Dominion medical school—why can't we get staff from overseas?

I was born in one Dominion, lived 20 years in the U.K. where I had my university and medical training and held several posts, and then came to a chair in another Dominion. I am thus a bit of a polyglot in my feelings of nationality, and, though I can understand it, I am not imbued with this "getting back" feeling that seems to beset young people today. Unfortunately this feeling is so strong that several of those who have come here from England to well-paid jobs, under conditions which they admitted were ideal, were obviously unhappy, and resigned and returned to England within 18 months or 2 years. We had the feeling that they thought this almost a foreign country. What has happened to the sturdy independent pioneering spirit that prompted my grandfather, for example, to leave English shores with his family, and make his home in the Antipodes? If the Empire is regarded in England as a series of foreign countries or a place to "get back" from, I am afraid that our own attitude towards England may change in the quite near future. It does not seem to be realised that we do not spend our time sitting, whisky and soda in hand, or whiling away the hours on the golf-course. First-class research can be done, and the clinical opportunities are almost limitless. In my own department we now have close ties with the United States, and the same applies to several others in this university.

Secondment and alliance between institutions here and in England, as suggested by the Traveller, would certainly be useful, but it would by no means cure existing conditions. What is needed is a reorientation of spirit.

* * *

She was 72 years of age and very ill. A few days later, thanks to a fundamentally sound constitution and modern chemotherapy, she had considerably recovered. As I was about to pass on to the next bed, she recalled me. "Doctor," she inquired hesitantly, "do you think I shall get better?" "Of course," I replied reassuringly. "You're well on the way to recovery already." "That's good, doctor, I do so much want to get back to my work." I was unable to disguise my surprise as I inquired what her work might be. "Well," she admitted shyly, "I look after an old lady!"

* * *

Members of the profession will be glad to learn that the tax increase on football pools, proposed in the recent Budget, does not apply to plebiscites.

* * *

B.M.A. spokesman on the plebiscite:

"There will be no quibbling or doubts about the form of the question—it will be a simple question that the doctor can answer."

Letters to the Editor

ATTACK ON RHEUMATISM

SIR,—The correspondence arising from your leading article of March 27 is indeed timely.

The question of specialisation in the chronic rheumatic diseases, as in other branches of medicine, raises problems. Increasing knowledge in every subject comprehending general medicine makes specialisation inevitable, and yet it is more than ever essential that the patient should be seen as a whole and that the part should not be wrongly interpreted as the whole. Walshe's contention "that the specialist must cling fast to the foundations of medicine and orient them" is of paramount importance today. The dangers of surrendering judgment to the fascination of a name is, as Henry Cohen has emphasised, nowhere more apparent than in this group of diseases. Initially the subject invades the territory of the general physician, although team-work, involving close consultation with expert colleagues like the physical-medicine specialist, the orthopædic surgeon, the neurologist, and the psychiatrist, is of outstanding importance.

These diseases present a problem comparable in magnitude and significance to tuberculosis. They are responsible for much social and economic disturbance, with infinite misery, disability, and invalidism, more often than not occurring in the prime of life of the bread-winner of the family; but because they are associated with morbidity rather than mortality they are relegated to the list of uninteresting and incurable diseases, and have been treated in the main almost with indifference by the profession, although few would contend that a life of helplessness and total incapacity, with the patient a burden to himself and society, is not worse than death. Nevertheless, the prevailing general attitude of defeatism in relation to the rheumatic diseases in general, and to chronic arthritis in particular, is quite unjustified.

At present inpatient and outpatient facilities, provision for undergraduate teaching as part of the curriculum in general medicine, and resources for research are hopelessly inadequate. The rheumatic diseases are *primarily* the concern of the general physician working closely with the general practitioner, and they must resume their rightful place within the province of general medicine if they are to be successfully controlled. That will mean that in the same way that general physicians have special leanings towards heart, lung, or gastro-intestinal diseases, so must there be an adequate number with a good knowledge of "orthopædic medicine" who have leanings towards the rheumatic diseases or—if you will—diseases of the locomotor system. Only in this way will the patient be viewed as a whole, for these diseases are, like tuberculosis, systemic diseases producing local manifestations in the joints and may simulate at one time or another many diseases in general medicine. The Ministry of Health has made it known that it attaches the greatest importance to the campaign against the group of illnesses labelled "chronic rheumatism," which in themselves demand a sound discipline in general medicine for their accurate diagnosis.

A complete rheumatism service, visualised in the National Health Service, comprehends specialised rheumatism units, suitably placed according to the needs of the population—a plan analogous to the proposed tuberculosis and chest service. These units should, wherever possible, be centred in the atmosphere of a general teaching hospital with all its ancillary services, linked also to a sufficient number of beds in country hospitals run on sanatorium lines. The primary functions of such institutions should be undergraduate and postgraduate teaching and coördinated research as well as treatment. In this way more favourable conditions for progress in the control and treatment of this widespread scourge would be achieved.

London, W.1. PHILIP ELLMAN.

SIR,—The diagnosis of the different varieties of the so-called rheumatic infections and the protracted nature of even the most satisfactory treatment have been a source of constant worry to most doctors engaged in general practice. It is most encouraging to learn that the Government attach great importance to the "attack on

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rheumatism," and it is to be hoped that the recommendations of the Ministry of Health's advisory committee will be put into effect without unnecessary delay. If the best is to be got out of any scheme the eager and enthusiastic coöperation of the general practitioner must be a sine qua non. At the present time most practitioners are rather at sea in differentiating the various types of rheumatism and the present-day means employed for their alleviation. Dr. Buckley's suggestion last week that weekend courses with clinical demonstrations should be organised by the large provincial hospitals for practitioners living in their district will be welcomed by all.

London, S.W.1. J. H. DUNN.

A BROKEN BACK

SIR,—This article, in your issue of April 3, gives a picture of spiritual valour against overwhelming physical odds that must be rarely equalled. The account of the way in which the authoress was able to defy each handicap as it arose, and so to find life worth while and its pleasures still within reach, is a most absorbing tale. It should be an inspiration, too, to others, who may have faltered before physical disabilities far smaller than those faced by the writer of this article.

Bristol. CHARLES CORFIELD.

FOR AND AGAINST MYANESIN

SIR,—In your leading article of March 27 you expressed the opinion that the recent clinical observations [1 2] on the central depressant effect and the lack of curare action of 'Myanesin' constituted a serious criticism. The central depressant effect and the lack of peripheral action (in therapeutic or tolerated doses) have been stressed in the first publication on this subject,[3] reiterated in your columns,[4] and commended in your leading article on Jan. 18, 1947.

Myanesin is not employed "in anæsthesia merely to potentiate mildly the narcotic drug which must be given at the same time" as you state. The use of myanesin during anæsthesia was recommended on the basis of the following considerations.[5]

During light anæsthesia, due to the release of subcortical centra from the control of the cortex there is marked hyperexcitability of the spinal and bulbar reflexes. At this level of anæsthesia the patient is unconscious but operative procedures cannot be carried out because of the hyperactivity of these defence mechanisms. Myanesin selectively depresses the hyperexcitability of the spinal reflexes, and, for this reason, permits the performance of operations at a lighter level of anæsthesia than would be possible in the absence of the drug. The paralysing action occurring after large doses (also due to the depressant action on the central nervous system) need not be made use of, as satisfactory relaxation usually occurs after hyperexcitability has been abolished. Synergism between the narcotic drug and myanesin is also likely to be of minor significance in the production of muscular relaxation.

Concerning the relative ineffectiveness of myanesin in muscle spasm, it is well to keep in mind that curare relaxes muscular spasms only in doses which paralyse,[6] whereas myanesin abolishes spasms in doses which do not diminish voluntary muscular power.[5] The efficacy of myanesin in relieving tetanic spasms was more pronounced than that of curare.[7] Schlesinger et al.,[8] who had extensive experience with both curare and myanesin, appraised myanesin as follows: "Its efficiency in ameliorating involuntary movements, rigidity, spasticity, and tremor are of a higher order than that of the curare series, and at least comparable to any known therapeutic agent." Myanesin passed the crucial test of the specific relaxing effects of such drugs on voluntary muscle, in producing the desired action without the support of any accompanying narcotic.

Because of the low solubility and the necessity of using solvents, myanesin in 10% solution may have caused hæmoglobinuria in 20 out of 10,000 patients, but did not cause respiratory paralysis. With curare peripheral respiratory paralysis occurs in the majority of cases and is dangerous even when efficiently managed.[6] It may well be that the mortality from curare during anæsthesia is greater than the incidence of hæmoglobinuria after myanesin. Myanesin administered intravenously in saturated aqueous solutions does not even cause hæmolysis or thrombosis.[8] Myanesin can also be safely administered by other routes. The dramatic effects obtained with myanesin in a variety of previously intractable conditions makes it certain that there will be a definite place in therapeutics for agents with a similar type of action.

F. M. BERGER,
University of Rochester School of Medicine and Dentistry, Rochester, New York.

1. Stephen, C. R., Chandy, J. *Canad. med. Ass. J.* 1947, **57**, 463.
2. Hunter, A. R., Waterfall, J. M. *Lancet*, March 6, p. 366.
3. Berger, F. M., Bradley, W. *Brit. J. Pharmacol.* 1946, **1**, 265.
4. Berger, F. M., Bradley, W. *Lancet*, 1947, i, 97.
5. Berger, F. M. *Brit. J. Pharmacol.* 1947, **2**, 241.
6. West, R. *Proc. R. Soc. Med.* 1935, **28**, 565.
7. Belfrage, D. H. *Lancet*, 1947, ii, 889.
8. Schlesinger, E. B., Drew, A. L., Wood, B. *Amer. J. Med.* 1948, **4**, 365.

SIR,—In last week's issue Mr. Vartan, as a gynæcologist, gave his views on 'Myanesin.' He claims that the relaxation obtained is comparable to that associated with spinal analgesia. I have observed this in a very much larger series of cases; but in some exactly comparable cases, where every detail of technique was identical, relaxation was absent or poor, or vanished at the slightest surgical trauma to the parietal peritoneum. Unpredictable action is the strongest argument against the use of any drug.

In my series there was 1 proved case of methæmoglobinuria and 2 of venous thrombosis—one minor and the other very serious. I cannot accept Mr. Vartan's suggestion that this is a matter of technique. The late Cecil Joll, himself a superb technician, once said to me that all intravenous injections should be given by anæsthetists since they were the only people who knew how. I would suggest that any anæsthetists who "have not the hands necessary for it" would better serve the interests of their fellow men by volunteering for work on the land or down the coal-mines.

Aylesbury. LOFTUS DALE.

MEASURED RADICAL GASTRECTOMY

SIR,—The article by Mr. Hedley Visick (April 3 and 10) raises several points of great interest in gastric surgery. Leaving a gastric pouch of a known size makes the subsequent history of such cases of real scientific value; and dividing the vasa brevia not only permits removal of more of the greater curvature where the mucosal folds are most marked, but combined with high division of the left gastric artery also allows the stomach to rotate on the œsophagus, thus facilitating the anastomosis.

Since watching Mr. Visick, I have adopted with advantage cutting of the vasa brevia to the Bilroth I operation—which I still regard as the most suitable type of partial gastrectomy for gastric ulcer. There is no doubt that the stomach can be widely devascularised without danger, but there are definite limitations. Necrosis of the mucous membrane and even sloughing on the posterior wall of the stomach have been known to follow gastric ligation. Visick has claimed that secondary ulceration will not follow if part of the antrum is left in cases where removal of the duodenal ulcer would be dangerous. If this is found to be correct, then measured partial gastrectomy will be a distinct advance, but unfortunately the pyloric antrum is such a strong stimulus in producing recurrent ulceration that it will require a much larger series than his 12 cases to carry conviction.

The results of partial gastrectomy are so good that there is a tendency to ignore the small percentage of disappointing results, especially in those cases which develop the postoperative symptoms of the so-called dumping syndrome. These symptoms may be so mild as to be ignored by the patient, or severe enough to be a major disability; they occur after all types of partial gastrectomy, but tend to disappear in time. Sometimes variations in the sugar content of the blood offer a sufficient explanation, but usually the cause remains unexplained.

Mr. Visick's article shows the necessity for follow-up clinics in gastric surgery, not only as a means of investigation but as the first step towards the treatment of postoperative symptoms.

Manchester. PETER G. MCEVEDY.

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DOSAGE OF VITAMIN E

SIR,—I have read with some dismay the article by Dr. Makinson and his colleagues, and the letter from Dr. Ball, in your issue of Jan. 17. Three highly pertinent matters appear to have been omitted from the discussion:

1. If vitamin E in moderate dosage cures angina or any other cardiac ailment, then such conditions must be considered as due to nutritional deficiency. The question then arises whether vitamin-E deficiency (*a*) is always the cause of angina, (*b*) is sometimes the cause, or (*c*) is a predisposing or conditioning agent which favours the development of angina, the basic arterial abnormality being other processes than improper tocopherol metabolism.

I think we may dismiss (*a*) at once. The difference between (*b*) and (*c*) is debatable, but I incline to (*c*). Here the implications are clear. The deficient patient will be a regional phenomenon—regional as regards age, income, dietary habits, profession; and, above all, habitat. The patients reported by Vogelsang and the Shutes [1] were drawn from a region (Canada) where fats and salad oils are almost devoid of vitamin E [2]; white bread (containing, by our analysis, only $^1/_{13}$ the vitamin E of British bread) is preferred; income and habits dictate legumes (containing inactive γ-E) instead of root and leaf vegetables (active α-E); and milk and butter, which not only contain little E but raise the body's requirements for the vitamin, are taken in great quantities. One of the Shutes' patients whom I questioned was living on milk, chocolate bars, breakfast cereal, and green salads; finally, peripheral vascular skin lesions appeared on her legs. It was the first clear-cut human "scaly-tail" syndrome [3] I had seen, and she responded at once with α-tocopherol, refined corn oil (supplying linoleic acid), and an increased protein diet.[4] The many cases of "heart" (we use the term advisedly) improvement noted by Dowd [5] are drawn from the Boston area where similar conditions can be observed. Clinics in the South where vitamin E has been tested for heart have only equivocal results to report,[6] but here the dietary intake of tocopherols is nearly always sufficient. It appears that the average British diet, containing present-day bread, margarine, and home-grown vegetables, should be adequate in E vitamins, though suboptimal in essential fatty acids and proteins. The first step surely in testing vitamin E for angina in Britain is to select the E-deficient patient, which may be done by taking careful diet histories and by analysis of blood and urine.

2. The dosage ratio is probably higher for α-tocopherol than any other vitamin.[7] If the average total human content is 3500 mg. in all tissues and the daily intake is 15–20 mg. (a probable maximum), the minimum period of half adjustment to change of intake is $\log_e 2 \times \frac{3500}{17{\cdot}5} = 138$ days, and much longer if the quantity absorbed is substantially less than that ingested; a 90% adjustment requires more than a year, and on this adjustment of content must be superimposed a metabolic rearrangement and perhaps structural repair of tissue. Three weeks' medication with vitamin E is about as promising as a weekend to learn Chinese. Even if the exponential accommodation were miraculously suspended and every milligramme taken by mouth were transmitted through the gut wall and laid down in tissue, the quantity administered by Makinson and his associates—$150 \times 21 = 3150$ mg.—would only just "fill" an "empty" patient. The assimilation in healthy persons is less than 50% and in deficients may be much less,[8] so the net repair of deficiency would be trifling. That blood levels are at once altered by 150 mg. per day is beside the point; the blood is the pipe-line from gut to tissue, and the line is distended long before the tanks are filled.

3. It has gradually become apparent and is now clearly stated by the Canadian workers that they are using α-tocopherol as a drug and not at nutritional levels. Those patients who respond at 0·25 g. per day relapse on half this dose, and the matter is said to have been tested by reversal of dosage. Their conditions do not appear to have been appreciated by your contributors, and they have certainly not been duplicated.

If we may judge by the correspondence passing through this laboratory, there are two distinct heart syndromes that respond to vitamin E. One is represented by the patient with mild or moderate cardiac decompensation; this person responds to moderate doses of vitamin E and claims immense benefit, over years, from the daily ingestion of 50–150 mg. α-tocopherol. The other is the anginal syndrome, with or without a previous coronary accident, described by Vogelsang and the Shutes; it is remedied in certain cases by very large doses of α-tocopherol.

I suggest that, before dismissing vitamin E in connexion with the health of the heart, the physician should select the deficient patient, and then make proper adjustment between dosage and time of treatment.

Distillation Products Inc.,
Rochester, N.Y. K. HICKMAN.

1. Vogelsang, A., Shute, E. V. *Nature, Lond.* 1946, **157**, 772. Vogelsang, A., Shute, E. V., Shute, W. E. *Med. Rec.* 1947, **160**, 163.
2. Quaife, M. L. Vitamin E Content of Common Foods (in the press).
3. Burr, G. O., Barnes, R. H. *Physiol. Rev.* 1943, **23**, 256.
4. Shute, E. V., Vogelsang, A., Skelton, F. R., Shute, W. E. *Surg. Gynec. Obstet.* 1948, **86**, 1.
5. Dowd, G. First Vitamin E Conference, Rochester, N.Y. Sept. 26, 1947.
6. Ruffin, J. M., Cline, J. K.
7. Hickman, K. *Interne*, April, 1946, p. 278.
8. Hickman, K., Harris, P. L. Advances in Enzymology. London, 1946; vol. VI, p. 469.

TREATMENT OF ACTINOMYCOSIS

SIR,—Cases reported recently, like that by Dr. Shorvon in your issue of March 20, show that in this disease no reputable remedy can be neglected, and that those in charge who have the greatest resource and perseverance will sometimes be rewarded by the recovery of desperate cases. But I do want to stress the value of iodine used as the tincture and given in milk as Chitty, of Bristol, taught us. It is much more effective than the potassium salt, and I have never seen it produce iodism.

In many cases of actinomycosis, including several of the abdominal type, I have seen great benefit from this remedy, which I regard as very valuable in this disease. The iodine must be given in adequate doses and the 10 or 15 minims often mentioned is far too small. It is best to commence with 20 minims thrice daily, increased to as much as a drachm of the tincture thrice in 24 hours, each dose administered in an ounce or two of fresh milk. With these large doses there may be a little mild intestinal colic, to be managed by subdividing the dose and giving it more frequently.

With the advent of penicillin the outlook is more hopeful than ever before, for when the streptothrix is penicillin-sensitive very striking results seem to be obtained. But no one remedy is as yet the solution to the management of what are often most intractable conditions, and as a rule combinations or successions of treatments will be necessary for complete cure. My present object is only to stress the value of iodine as a therapeutic agent which recent communications seem to have damned by very faint praise.

Taplow, Bucks. G. GREY TURNER.

TERMINOLOGY OF THE RH FACTOR

SIR,—While the subject of the Rh factor is still fresh in our minds there are two points which I think might be elucidated through your columns.

The first is the question of "dominance." In your editorial of Feb. 28 you refer to "Fisher's idea of a trio of recessive antigens, c, d, and e." Did Fisher in fact use the letters C, D, E, c, d, and e because he thought that C, D, and E are dominant to c, d, and e? Opposed to this conception is the statement of Dr. J. A. Fraser Roberts that "there is no dominance or recessiveness" (*Med. Pr.* 1947, **217**, 7).

The second question is why Fisher did not call the next most common blood antigenic factor after A and B C instead of D? In which case R_2 would become CdE instead of cDE and R_0 would become Cde instead of cDe. Moreover, it would be easier to remember the order on the compound gene, which would be CDE instead of DCE. Perhaps, however, DCE would be less difficult to remember if we knew the reason for its origin.

London, N.W.1. W. A. L. COLLIER.

*** (1) The question of dominance and recessiveness in the Rh series of genes has been recently discussed by Mourant (*Nature, Lond.* 1947, **160**, 353). He reaches the conclusion that C and E are partially dominant to c and e, for bloods containing a single dose of the antigens c and e react several times less strongly with anti-c and anti-e sera than do bloods containing a double dose. Furthermore, there is some

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evidence that blood containing a single dose of c is far less effective antigenically than one containing a double dose, whereas blood containing a single dose of C is apparently almost as effective as one containing a double dose. The position with regard to D and d is less certain since anti-d has not been available for testing. (2) Fisher presumably gave the names C and c to the pair of antigens so named because, owing to the availability of anti-c, they were the first pair of allelic antigens that could be distinguished from one another.—ED. L.

INTRA-ARTICULAR INJECTION FOR OSTEO-ARTHRITIS

SIR,—May I give my personal experience of this treatment?

In 1938 I had much pain in my left hip-joint after hunting, and in January, 1939, I had to cease riding. Pain increased during the war years; by 1945 I was unable to walk more than a short distance, and pain was very severe. In November of that year I had to sell my practice; there was great strain on exertion, and shortness of breath. Radiography showed severe osteo-arthritis of the left hip too dense for detail; the right hip was normal. At this time Mr. Grant Waugh kindly consented to treat me, and after the third injection pain was decidedly less; there was little reaction, exercise movements were easier and less painful, and I was able to walk farther each week. Treatment commenced in June, 1947, and ended last December after ten injections. I am now able to walk and stand for three or four hours, as I did at Cheltenham races last month.

I am confident this treatment should be fairly tried. No harm is done if the patient does not improve. Failure in cases I know has been due to refusal to carry out the exercises.

Middleton Stoney, Oxon. J. HOLMES.

ENDOGENOUS CREATININE CLEARANCE IN INFANCY AND EARLY CHILDHOOD

SIR,—Known tests for the estimation of blood clearance have been applied hardly at all to infants and young children. As regards urea clearance, "the normal standards in these very young subjects are not as yet accurately defined."[1] Rehberg's[2] pioneer work was concerned with an exogenous creatinine test; but the endogenous creatinine test, according to Popper and Mandel,[3] seems reliable enough for clinical purposes, and it is much more easily applied than other clearance tests.

We have so far used this test in more than 80 infants and young children between the ages of one month and four years. Among them 48 could be regarded as normal cases; the bulk of the remainder were more or less severe cases of infantile malnutrition atrophy. The main problem in the evaluation of our results has been to establish normal values in this age-group. It seemed probable, as has been suggested by McCance,[4] that body-surface is here even more important than in adults, and equally that age means less than weight. A third correlation—between development and clearance—could be supposed. For many years and in many pædiatric institutions there has been routine investigation of the so-called "quotient of development" (D.Q.)—i.e., the ratio of the actual weight to the average normal weight for the same age. In normal children it is approximately 1·0; in overweight cases it is above this figure; and in underweight cases below it. Cases of malnutrition have a D.Q. of under 0·8. Though clearance values usually increase with age, the differences between those in the first four years of life are not significant.

We calculated the correlation between age, weight (W), and D.Q. on the one hand, and clearance per sq. m. body-surface (CS) on the other. For the calculation of CS the data of body-surface given by Benedict and Talbot[5] were used. We found a distinct positive correlation between W and CS, and between D.Q. and CS. Following the regression coefficients, the rise of W with 1 kg. corresponds to 2·2 units of CS. From the detailed positive correlation between W and CS, provided that D.Q. = approx. 1·0, the following empirical formula could be deduced: $CS = 2{\cdot}2\,W + 10{\cdot}1$. Our analysis showed that malnutrition is linked with a marked decrease of the CS values.

Our results agree with the earlier observation by McCance and Young[6] of an immaturity in renal function during early life, with a steady approach to functional maturity, provided development is normal. By our method this process seems, however, to be slower than is indicated by them.[7] Many problems of this age-group, especially in infancy, are connected with the smaller clearance capacity.

We are sincerely indebted to Dr. Peter Bálint, clinical pathologist of the 1st Medical University Clinic, who has been of great assistance to us.

Municipal Institute for the Protection of Mother and Child, Budapest. JULIUS SURÁNYI. STEPHEN ZIMANYI.

SODIUM SALICYLATE AND COPPER AMINO-ACETATE IN TUBERCULOSIS

SIR,—I wish to report a method of treating pulmonary tuberculosis which is based on experience gained in 12 years' research and clinical observation. Unfortunately owing to war-time conditions I cannot provide statistics.

Briefly, the exudative stage is treated with sodium salicylate, and the caseo-cavernous stage with copper amino-acetate. The details of treatment with sodium salicylate were first published by my assistant, Dr. M. Zielinski, in Poland in 1934, and the use of copper amino-acetate by Dr. W. K. Massalski and myself in 1936. Since then thousands of patients have been successfully treated with these remedies.

In exudative tuberculosis with a high erythrocyte-sedimentation rate (E.S.R.) and a temperature of 99°F or more an intravenous injection of 5–10 ml. of a 10% solution of sodium salicylate is given daily or every second day until pyrexia disappears and the E.S.R. improves to 40 mm. or less in 1 hour (Westergren). In such cases the treatment exerted a well-marked beneficial effect on E.S.R. and produced euphoria. In patients with a low E.S.R. no such effect was observed. A risk to be guarded against is hæmorrhage, owing to the fact that sodium salicylate dilates the lung vessels. Therefore hæmorrhage, even bloodstained sputum, is a contra-indication.

For the treatment of the caseo-cavernous stage with a temperature about normal and E.S.R. below 40 mm. in 1 hour (Westergren) copper amino-acetate is prepared by distilling a mixture of 1 part of amino-acetic acid, 5 parts of copper carbonate, and 40 parts of distilled water. The standard 0·5% solution of copper amino-acetate contains 5 mg. per ml. The standard solution should be given only by intravenous injection. Given subcutaneously or intramuscularly it produces a painful induration of the local tissues. Injected intrathecally it can cause sudden death. Given by mouth, even in small doses, it causes vomiting. The standard solution can be diluted to any required concentration by adding sterile distilled water. The largest single dose that we have given to a patient was 20 ml. of the standard solution (0·1 g. of copper amino-acetate). We have found the best results to follow intravenous injections of 5 ml. of the standard solution (2·5 mg. of copper amino-acetate) daily for 4–8 weeks, after which the patient and his veins are given a rest for a fortnight before resumption of the treatment, which should be continued for months or even years until every symptom of tuberculosis has disappeared. The patient must be kept under regular clinical supervision, and special care should be taken to measure the E.S.R. at least once a fortnight. If the E.S.R. rises to over 40 mm. in 1 hour (Westergren), the treatment must be stopped and sodium salicylate injections given instead. Usually the E.S.R. improves pari passu with the other signs and symptoms.

Even in extensive chronic tuberculosis with cavitation copper amino-acetate causes a lasting improvement

1. Holt, L. E. jun., McIntosh, R. Holt's Diseases of Infancy and Childhood. 11th ed., London, 1941.
2. Rehberg, P. B. *Biochem. J.* 1926, **20**, 461; *Ibid*, p. 477.
3. Popper, H., Mandel, E. *Ergebn. inn. Med. Kinderheilk.* 1937, **53**, 685.
4. McCance, R. A. *Schweiz. med. Wschr.* 1946, **76**, 857.
5. Carnegie Institute Publication no. 233, 1915; no. 302, 1921.
6. McCance, R. A., Young, W. F. *J. Physiol.* 1941, **99**, 265.
7. Young, W. F., McCance, R. A. *Arch. Dis. Childh.* 1942, **17**, 65.

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if the treatment is continued sufficiently long. Small cavities have often disappeared after only two or three months' treatment. The healing effect of copper amino-acetate appears clinically very early. The rapid disappearance of exhausting perspiration and the decrease of sputum bring physical and mental comfort to the patient. But pyrexia, if present, remains unaffected by copper amino-acetate, even in large doses. Intravenous sodium salicylate should be used to combat this symptom.

Properly used, copper amino-acetate never causes toxic reactions except occasionally a transient rash, for which the treatment need not be stopped. The drug appears to be either partly excreted by the skin or deposited in it. Consequently it gives benefit in tuberculosis of the skin. In large doses it has even produced a beneficial result in psoriasis. In patients with healthy kidneys the urine was not found to contain albumin during treatment; but copper amino-acetate is contra-indicated in renal disease. It is also contra-indicated when the E.S.R. is more than 40 mm. in 1 hour (Westergren). Bloodstained sputum or hæmorrhage is no indication to stop treatment with copper amino-acetate.

The scheme of treatment of pulmonary tuberculosis can be recapitulated as follows:

(1) Pyrexia and E.S.R. above 40 mm. in 1 hour (Westergren) call for sodium salicylate.

(2) An approximately normal temperature with E.S.R. below 40 mm. in 1 hour (Westergren) calls for copper amino-acetate.

(3) If pyrexia disappears under treatment with sodium salicylate but E.S.R. remains high, copper amino-acetate should be tried.

In cases with a slightly raised temperature and approximately normal E.S.R. absence of response to copper amino-acetate seems to indicate that the illness is not tuberculosis.

Warsaw. Z. MICHALSKI.

POST-MORTEM CÆSAREAN SECTION

SIR,—A woman, aged 35, was admitted to the teaching hospital in Bagdad on Oct. 29, 1946, in a late stage of pregnancy with three days' history of fever followed by coma. Pneumococcal meningitis was diagnosed, and the patient was transferred to the isolation hospital. Next day the patient began to have convulsions, and I was called to see her. I decided to perform cæsarean section, but the chief of the obstetric department refused permission; so I tried to take the patient back to the teaching hospital, but she died before she reached the ambulance. The body was taken to the M.O.'s office in the isolation hospital, and there I performed a cæsarean section, with a tracheotomy knife I found there, about five minutes after the patient's death. The baby (a girl) was in a condition of asphyxia pallida, and it took about half an hour's artificial respiration and changing the baby from hot to cold water before she took her first breath.

Kadumia Hospital, Bagdad. KHALID NAJI.

ORAL PENICILLIN

SIR,—Your leading article of Jan. 10, on Penicillin Excretory Blockade, contained an excellent exposition of the merits and demerits of 'Caronamide' in which it was inferred that, given a suitable chemical of this type, oral penicillin may become more feasible.

As the largest manufacturers of penicillin preparations in the Southern Hemisphere, we are particularly interested in the future of penicillin administration, and we are in a position to flood the Australian and Far Eastern market with tablets of penicillin for oral administration. We are, however, diffident about doing this as we realise the complete impossibility of policing any regulations prohibiting the sale of penicillin tablets except on prescription.

We contend that, once the tablets are made and issued for sale, they will find their way to those suffering from such conditions as gonorrhœa, who will resort to self-diagnosis and self-medication. Such persons would not continue the treatment after the obvious signs had disappeared, and having insufficiently dosed themselves would probably disseminate penicillin-resistant bacteria to future contacts. That about 3% of persons so treated would in addition be suffering from syphilis makes this possible practice all the more dangerous. In fact, it could lead to the loss of penicillin as a very useful medicament.

We deprecate any tendency to enlarge the scope of oral penicillin treatment, for we are sure this will eventually lead to abuse, misuse, and finally disuse of penicillin.

A. M. Bickford & Sons, Ltd., Adelaide. H. G. WILLIS.

ANÆMIAS

SIR,—In his article on April 10 Professor Sundaram states that the observations of Wills and Evans on tropical macrocytic anæmia were made before sternal puncture became the essential basis of differential diagnosis. In fact I performed sternal punctures on all our cases in 1937–38. Professor Sundaram need not doubt the nature of the cases we described as tropical macrocytic anæmia, since true megaloblasts of Ehrlich were seen in the marrow-films of all cases before treatment.

Pathological Department,
Queen Victoria Hospital,
East Grinstead. BARBARA D. F. EVANS.

RISKS OF STERNAL PUNCTURE

SIR,—I was interested in your annotation of April 10, especially as I was the coroner who held the inquest quoted therein.

I cannot help feeling that the fact that there have been few recorded fatalities from this procedure is a tribute to the skill and care exhibited by the operators of the technique. It would indeed be unfortunate if others were encouraged to embark on such examinations without full appreciation of the potential dangers.

At the inquest in question it appeared in evidence that the operation was carried out by an experienced pathologist. In spite of this the sternum was transfixed and the heart punctured with resulting fatal hæmopericardium. An independent autopsy was carried out by Dr. Keith Simpson, and to my mind he summed up the danger inherent in the procedure when he pointed out that the margin of safety between a successful examination and sudden death was one-eighth of an inch. Where, as was stated in this case, there is some pathological condition present which alters the normal consistence of the bone, it appears to be an unjustifiable risk to take. I was glad to see that you had stressed this point in your article.

I therefore feel that, although sternal puncture may be a useful and justifiable procedure, my remarks on the case in question that it was a "highly dangerous procedure" were justified. J. M. ROBERTSON

Deputy Coroner, County of London,
London, E.C.4. Northern and Southern Districts.

MASSIVE ADRENAL HÆMORRHAGE

SIR,—Reviewing Dr. Kappert's book in your issue of March 27, you apparently take the view that the so-called Waterhouse-Friderichsen syndrome should have been named after E. Graham Little, who collected some cases and published a paper in 1901.[1]

If eponymous nomenclature is to persist, then the disease should correctly be named after Voelcker, who adequately described the clinical and post-mortem picture in 1894.[2] Furthermore, the condition was subsequently described by Andrewes,[3] Garrod and Drysdale,[4] Batten,[5] and Talbot[6]—all before Little's paper in 1901.

Banks and McCartney[7] used the term "meningococcal-adrenal syndrome," which would seem suitable since most authors believe the meningococcus is the only organism that causes massive hæmorrhage into the adrenals.[8] The evidence for this is debatable and if not conceded the phrase "acute adrenal insufficiency" would seem the best choice.

1. Little, E. G. *Brit. J. Derm.* 1901, **13**, 445.
2. Voelcker, A. F. *Rep. med. surg. path. Registrars Middlesex Hosp.* 1894, p. 279.
3. Andrewes, F. W. *Trans. path. Soc. Lond.* 1898, **49**, 259.
4. Garrod, A. E., Drysdale, J. H. *Ibid*, p. 257.
5. Batten, F. E. *Ibid*, p. 258.
6. Talbot, E. *St Bart's Hosp. Rep.* 1900, **36**, 207.
7. Banks, H. S., McCartney, J. E. *Lancet*, 1943, i. 771.
8. Herbut, P. A., Manges, W. E. *Arch. Path.* 1943, **36**, 413. Martland, H. S. *Ibid*, 1944, **37**, 147. Thomas, H. B., Leiphart, C. D. *J. Amer. med. Ass.* 1944, **125**, 884.

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Little, even though much earlier in the literature of the subject than either Waterhouse (1911) or Friderichsen (1918), has no greater claim to the original description than they.

East Molesey, Surrey. PETER P. TURNER.

TREATMENT OF VARICOSE VEINS

SIR,—I feel that there are some points in your summary last week of my paper read at the Royal Society of Medicine on April 7 which may be misleading if left without a little further clarification.

1. Microscopic or serial X-ray film examinations of radio-opaque injections into varicosities show that the dye remains where it is injected as long as the leg remains horizontal and at rest—not merely for a minute or two. Sclerosing solution can, under these circumstances, be left in contact with the intima as long as desired. Five minutes was the arbitrary time suggested before vigorous movement to sweep away the solution.

2. "However carefully it was done, large amounts of medium collected rapidly in the deep veins." This was true only under certain circumstances. With amounts up to 1·5 ml., using empty-vein technique with the leg horizontal, direct injection into the leg varicosities can be accurate and effective, and the deep veins and their valves and communications escape damage.

3. The veins removed for section showed pathological changes despite the absence of clinical "take." The changes were marked in the neighbourhood of valves.

It is suggested that ineffective injections which do not produce permanent obliteration may do harm by damaging valves in deep and communicating veins. This is most likely to happen with the retrograde injection technique, or when injections are made with the patient standing.

Surgical Professorial Unit,
St. Bartholomew's Hospital,
London, E.C.1. J. B. KINMONTH.

OVERCOMPENSATION IN DISABLEMENT

SIR,—An inherent weakness of the Disabled Persons (Employment) Act, 1944, is that, though jobs are found for the disabled, more attention is paid to the orthopædic than to the psychological aspect of their care. It is not fully realised that the psychological damage incurred after an accident or injury is often out of all proportion to the extent of the lesion when judged by purely orthopædic standards.

My own experience illustrates the phenomena associated with disablement. Two years ago I sustained a fracture-dislocation of the head of the right humerus and ended with an almost complete paralysis of the ulnar and median nerves. Since I am right-handed and my work consists almost entirely of surgery, midwifery, and anæsthetics, this disablement was a severe handicap. For the first few days after the accident pain overshadowed everything else. As the weeks went by the pain passed, but the realisation that my right arm was almost completely paralysed caused severe bouts of depression and nightmares. I can well imagine that in this stage, if the doctor in charge does not keep a close watch on the patient, a complete breakdown and even suicide can follow. The next stage—the stage of compensation—developed in my case some three months after the injury. This stage, however, does not develop in all cases of injury or disablement; and where the medical treatment is inadequate, or the make-up of the patient weak, no compensation takes place, and the patient goes from bad to worse, ending as an unemployable cripple. Fortunately the incidence of this type of case is probably not more than 5% of all disabled. The rest, like myself, adjust themselves to the handicap.

Some patients require a lot of encouragement to restore their self-confidence, but much harm can be done by giving this encouragement indiscriminately. When patients with leg injuries are encouraged to "throw away their crutches," some can carry on without their crutches, but others fall and break their legs or arms, and when this happens it may be impossible to restore their confidence.

This leads me to the subject of overcompensation, by which I mean excessive self-confidence in the disabled person. I have known blind men become so confident that they have discarded their white walking-sticks and been injured or killed by traffic. Again, it is very common for a man with a disabled arm or hand to attempt more intricate work than he would have attempted if he had not been disabled, with the result that he has had to be treated for injuries or even loss of fingers through too much confidence in using machines. In my own case I became so determined that I could and would use my right hand that I turned out a dozen original papers in the first year of my disablement; unfortunately, this excessive activity caused an intense ulnar neuritis which put me off all work for several months. Doctors, shop stewards, and others must be made aware of this danger if it is to be avoided. I have encountered this tendency to overcompensation in about half the patients who have come under my care.

Psychotics or people with a family history of nervous instability sometimes develop so much overcompensation that they not only claim that they can work better than normal people but have delusions that they have performed imaginary feats of skill. These cases, if not recognised, can become a menace to their fellow-workers and to themselves, since they will take the most appalling risks at their work. I hand these patients over to a psychiatrist, and the ultimate results in skilled hands have been good. This condition was seen in about 1% of the disabled people under my care. Seven of them recovered after narco-analysis; only one did not respond to any treatment and had to be certified for his own protection.

Evans Biological Institute,
Runcorn, Cheshire. JOHN H. HANNAN.

Parliament

FROM THE PRESS GALLERY

Capital Punishment

IN the House of Commons on April 14, at the report stage of the Criminal Justice Bill, Mr. S. S. SILVERMAN moved a new clause to suspend the death penalty for murder for a probationary period of five years in the first instance. Capital punishment he described as a revolting and barbaric procedure surrounded with melodrama and sensationalism. Until human judgment was infallible we had no right to inflict irrevocable doom. Above all, the penalty denied the principle on which we claimed the right to inflict it—the sanctity of human life. The only possible justification for its retention was to protect society, and in his view there was no proof that it was necessary.

Mr. M. C. HOLLIS, in seconding the clause, argued that increased efficiency in the detection of crime was a more important deterrent. To abnormal pathological types capital punishment might even be a slight encouragement to murder, for it gave such men extra thrill and satisfied their mania for publicity. Public opinion already demanded a reprieve wherever there was the smallest scintilla of doubt. Thus we offered to the abnormal type all the thrills of risking his life and comparatively little of the dangers of actually losing it.

Sir JOHN ANDERSON on the other hand, who for ten years was the permanent head of the Home Office, believed that the death penalty did reinforce the protection of society, and diminished the risks to which the police were exposed. If capital punishment went, what, he asked, was to be substituted for it? Experienced people held that we ought not to contemplate holding criminals in prison for longer periods than are now maintained. Would public opinion stand letting prisoners convicted of murder of the worst kind return to the community after 10 to 15 years of detention? This was not a good time to choose, when standards all over the world had been relaxed and human life cheapened by the experience of war. He suggested that a safer method to deal with the problem would be by an administrative adjustment of the criterion upon which the prerogative of mercy was exercised by the Home Secretary.

In the debate which followed, Mrs. AYRTON GOULD reminded the House that a long term of imprisonment

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under the new Bill would be something quite different from what it had been before. If we retained the death sentence it would be impossible to carry out the new remedial principles, for it would then be impossible to persuade the right type of men and women to join the prison service.

Mr. CHUTER EDE, the Home Secretary, did not think public opinion shared the view that there was something intrinsically wrong in taking the life of a person who had deliberately, and with malice aforethought, taken the life of another. The post-war years had seen the emergence of the armed criminal who hardly existed before. The police had the right to expect that while they were unarmed, the nation would make it clear that the criminal who used arms or violence in his attempt to evade arrest would be dealt with with the utmost severity. In 1938, Mr. Ede added, 97 murders were committed; and last year 134. In his view, but for the death penalty the figure would have been much higher. Any person who suffered the supreme penalty of the law was a person for whose crime it was impossible to find any legitimate excuse. The administration of the law had become increasingly generous in that respect. No-one could give an absolute assurance that no mistakes would be made, but judges always warned juries that any reasonable doubt must be resolved in favour of the prisoner, and there was no responsibility which fell on any Minister of State which caused greater personal concern to the man who had to discharge it than the exercise of reprieve of the capital sentence by the Home Secretary.

The Government allowed a free vote on the new clause, but this was not extended to Labour Ministers. The clause was carried by 245 votes to 222. When the figures were announced there was a loud outburst of cheering in all parts of the Chamber and excited members stood in their places and waved their order papers. The hubbub lasted for some minutes. The Bill was read the third time in the House of Commons on April 16 after the Home Secretary had announced his decision to advise the King to commute death sentences, by means of conditional pardon, to penal servitude for life, during the period which would elapse before the Bill became law. Mr. Ede also made it clear that the Government now accepted the decision of the House on the new clause.

TREATMENT OF MENTAL CONDITION OF OFFENDERS

During the discussion on clause 4 of the Bill, Mr. EDE moved two amendments, to make it clear that the inclusion in a probation order of a requirement relating to the treatment of a mental condition is governed by the general provisions of clause 3 of the Bill, which require the consent of an offender over the age of 14 before the order is made.

Mr. Ede also moved two further amendments confirming that the doctor who is consulted about the mental state of an offender should be one who is really competent to give to the court guidance. He explained that his object was not to confer a statutory distinction upon any particular diploma or society that might be formed of medical men who would claim to possess this particular knowledge. It would be the duty of the courts, he said, to make themselves reasonably acquainted with the qualifications of the doctors concerned. On the other hand, he thought the wording of the amendments removed the misgivings felt by some members that an ordinary general practitioner with no great knowledge of mental disorders could be called before the court and express an opinion which would result in an offender being dealt with on what was really not very skilled advice.

QUESTION TIME

Health Centres

Mr. J. F. F. PLATTS-MILLS asked the Minister of Health if he was aware that widespread anxiety had been aroused by his recent circular to local authorities discouraging any development of health centres at the present time; and, in view of the advantages of the health centre stressed by the Medical Planning Commission in 1942, and the obligation resting on local health authorities under the new National Health Service scheme to provide such centres, whether he would now issue further instructions making it clear that it was not his intention to discourage any initiative in the planning and setting up of new health centres.—Mr. ANEURIN BEVAN replied: There is evidently a misunderstanding. I have never wished to discourage health centres, which will be a key feature of the new health service. But I have had to point out the building stringencies of the moment and say that I do not, therefore, expect any widespread programmes yet.—Mr. PLATTS-MILLS: In view of the extent of the misunderstanding which arose over the first circular relating to this matter, and of the immense support there is, particularly among doctors, for the idea of group practice, as indeed there is in the rest of the medical world, would the Minister consider issuing a further circular to clarify the position that has arisen, and also consider encouraging the provision of some health centres in advance of others, where they are particularly needed? Mr. BEVAN: The misconception arises out of the fact that citizens allow their ideas to be determined by headlines in the press and not by the circulars themselves. If they had read the circulars they would have seen that I encouraged the local authorities to put up their plans.

Colonel M. STODDART-SCOTT: If there is not to be a universal distribution of health centres throughout the country in the next year or two, will the Minister recommend that the weekly contribution should be reduced?—Mr. BEVAN: That astonishes me. The weekly contribution bears very small relationship to the total expenditure on the National Health Service, which is largely borne by Exchequer funds.

Dr. HADEN GUEST: Where a health-centre building cannot be established, may I ask whether the Minister would encourage the formation of group practice by medical teams where it is essential in future to have centres?—Mr. BEVAN: I have all along expressed the opinion that partnerships and grouped general practitioners are desirable features, and they are being encouraged in the new service. Facilities are being given to enable new entrants to act first as assistants.

Postgraduate Grants to Specialists

Group-Captain C. A. B. WILCOCK asked the Minister of Health if he was aware that a number of trained medical specialists in receipt of Government grants would terminate their appointments at hospitals before the appointed day; and what steps he proposed to take to ensure the continuation of these grants until such time as appointments were made under the new Act.—Mr. BEVAN replied: I understand that my hon. friend is referring to the appointments under the scheme for postgraduate education for doctors released from the Forces, now held by practitioners who before joining the Forces were training to become specialists and desire to continue their training. This scheme will continue under the National Health Service. Some of the practitioners concerned are, on account of their individual circumstances, receiving grants under the Government's further education and training scheme. These also will continue.

Orthopædic Delegation to North America

Sir ERNEST GRAHAM-LITTLE asked the Chancellor of the Exchequer if he would reconsider his refusal of a dollar allotment to more than 20 members of the British Orthopædic Association who wished to attend the joint meeting of the American, Canadian, and British Orthopædic Associations to be held in Quebec in June, followed by a tour of leading orthopædic surgical clinics in America as the guests of the American Orthopedic Association, having in mind the experience to be derived by British surgeons by such a visit, the advantages to Anglo-American friendship, and the relatively small dollar expenditure involved.—Sir STAFFORD CRIPPS replied: I am fully alive to the value to be derived from meetings of this kind, but I am afraid that in our present position I can only provide dollars for a representative delegation of about 20 members of the association.

Medical Evidence in a Divorce Petition

Sir ERNEST GRAHAM-LITTLE asked the Secretary of State for War if he was aware that his department informed the solicitors acting in divorce proceedings for the wife of a patient under treatment at a military hospital for venereal disease that they could obtain the information regarding

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the nature of his disease from the medical practitioner who was named to them as having had the care of this patient in hospital, in breach of the assurance given to all patients entering hospital with V.D. that no such information would be given to any third party; and if he would inquire into this case and take steps to prevent a repetition of this breach of confidence.—Mr. EMANUEL SHINWELL replied: No such statement was made to the solicitors. The name of a doctor formerly serving in the R.A.M.C. who it was thought might be able to give evidence from personal knowledge of this case was supplied to them in accordance with the normal practice of my department for the sole purpose of enabling a subpœna to be served.

Obituary

GORDON THOMAS CALTHROP

M.A., M.D. CAMB., D.M.R.E.

Dr. G. T. Calthrop, radiologist to the Royal Free Hospital and the Princess Beatrice Hospital, London, died at his home at Luffenhall on April 14 at the age of 57.

Calthrop took up radiology late in life and despite ill health he made his mark by his fine work on gastro-intestinal radiology. It was largely due to his writing and efforts that the Berg technique for the examination of the gastro-intestinal tract was adopted in this country. Possessed of unbounded energy, he did not take kindly to the limitations imposed on him by his physical disability, and he has left an example of what can be done against overwhelming odds. He spared himself neither in his hospital work nor in his private practice, and it came as no surprise to his friends when early in 1940 he was ordered to retire. But after a year he returned to hospital and private practice against the advice of his medical friends. To their astonishment he continued with his work until increasing ill health finally compelled him to retire in 1946. In his retirement he devoted himself to the planning and beautifying of his garden.

He was educated at Trent and Emmanuel College, Cambridge. Entering the London Hospital he took his Conjoint qualification in 1918, and in the following year he graduated M.B. After holding resident posts at the London Hospital and at the City of London Chest Hospital, he took his D.P.H. Camb. and entered the service of the P. & O. as a ship's surgeon. His heart had been badly damaged as the result of rheumatic carditis, and it was this fact which influenced him in his choice. Although happy in his life at sea he resented the restricted medical outlook, and in 1930 he decided to specialise in radiology. After taking his M.D. in 1930 and his D.M.R.E. two years later, he studied for a time in Germany under Albrecht and Berg. His worth as a radiologist was quickly recognised by his colleagues, and he rapidly gained a considerable private practice. In addition to his appointments at the Royal Free Hospital and the Princess Beatrice Hospital, Calthrop was also radiologist to the Radium Institute and the Charterhouse Clinic for Rheumatism.

He is survived by a widow and one son.

ALISON MARY HUNTER

M.B. GLASG., F.R.C.O.G.

Dr. Alison Hunter, gynæcological surgeon to Glasgow Royal Infirmary, died at her home in Glasgow on March 26. She graduated in medicine in the University of Glasgow in 1918 and was elected F.R.C.O.G. in 1939. For many years assistant to the late James Hendry, Muirhead professor of obstetrics and gynæcology, on his death in 1946 she succeeded him on the staff of the Royal Infirmary. Dr. Hunter was also on the staffs of the Redlands Hospital for Women and the Glasgow Royal Mental Hospital.

She gave generously of her time and energy to the Medical Women's Federation, of which she was treasurer. She also did much useful work for the National Vigilance Society, and was formerly chairman of the Glasgow branch.

"Alison Hunter," writes a colleague, "was the first woman to be given charge of beds in the Glasgow Royal Infirmary, and many of her friends hoped that she might yet attain full professorial status, for her forceful mode of speech and the conviction with which she expressed her opinions made her an excellent teacher. Her life was remarkable in that she bore an exceptionally large burden of consultative, operative, and teaching work with vigour and enjoyment."

A. M. R., who was her resident twenty years ago, adds: "Alison Hunter had a plain direct manner and a simple heart, and I remember, still, her reliability and unselfish expenditure of time and energy for her patients. Even in those early days money did not interest her, and she was happy in the reward which her work, well and truly done, brought her. The standard she carried bore all the devices which ennoble our profession."

ROBERT MICHAEL FORDE

L.R.C.P.E.

Dr. R. M. Forde, who first observed the trypanosome which causes sleeping-sickness, died at his home in Worthing on March 27 at the age of 86.

He was born at Cloyne, co. Cork, and studied medicine first at Queen's College, Cork, and later at Edinburgh. After qualifying in 1885 he served for some time as a ship's surgeon, later joining the Colonial Medical Service in West Africa, from which he retired in 1914 after holding the post of principal medical officer of the West African Medical Service.

It was in 1901, in the blood of a European patient at Bathurst, Gambia, that Forde first saw the trypanosome. Though at the time unaware of the true nature of the parasite, he was struck by the peculiar symptoms and course of the infection, which he recognised as a new disease of man, attributing it to the presence of the "small, worm-like, extremely active bodies" which he had found in the blood. The patient, master of a Government steamer, was invalided to England shortly afterwards. On his return to the Gambia six months later he was again seen by Forde, who asked Dr. J. E. Dutton, who was at that time in Bathurst on a mission from the Liverpool School of Tropical Medicine, to examine the blood. Dutton saw the same micro-organism, which he recognised as a trypanosome and later described under the name *Trypanosoma gambiense*.

Forde reported his discovery in the *Journal of Tropical Medicine* (1902, 5, 261), and although the credit of recognising the true nature of the causative organism of sleeping-sickness undoubtedly belongs to Dutton, the importance of Forde's contribution to the ætiology of this disease has been appreciated.

Dr. Forde, who had been an invalid for the past four years, leaves a widow and one son. C. A. H.

Births, Marriages, and Deaths

BIRTHS

ADDISON.—On April 11, the wife of Dr. G. M. Addison—a son.
BICKFORD.—On April 14, the wife of Mr. John Bickford, F.R.C.S.—a son.
CRAIG.—On April 12, in London, the wife of Dr. W. J. Craig—a son.
FAWSETT.—On April 11, at Worcester, the wife of Dr. E. L. Fawsett—a daughter.
FOLEY.—On April 12, in London, the wife of Dr. John Foley—a son.
GOLDTHORPE.—On April 16, the wife of Dr. A. M. Goldthorpe—a daughter.
HERFORD.—On March 31, at Boston, Mass., the wife of Dr. Martin Herford, D.S.O.—a daughter.
INGOLDBY.—On April 12, in London, the wife of Dr. C. W. H. Ingoldby—a son.
KIPLING.—On April 15, the wife of Dr. M. D. Kipling—a daughter.
SPRINGETT.—On April 14, in London, the wife of Dr. V. H. Springett—a daughter.
TUNNARD.—On April 10, at Malmö, Sweden, to Cecilia (Dr. H. C. Lingfield), wife of Michael Tunnard—a daughter.
WINTERTON.—On April 17, in London, the wife of Mr. Ralph Winterton, F.R.C.S.—a son.

MARRIAGES

BLACKLAY—DURIE.—On April 10, in Edinburgh, Francis William Blacklay, M.B., to Anne Beatrix Durie.
FIELDING—NYE.—On April 17, at Ntlaza, Kaffraria, the Rev. Ronald Jeffrey Fielding, B.SC., to Irene Nye, M.R.C.S.

DEATHS

EDWARDES.—On April 16, George Vernon Edwardes, L.R.C.P.E., aged 82.
LANGSTAFF.—On April 12, James William Langstaff, D.S.O., L.R.C.P.I., colonel, R.A.M.C.
MORNEMENT.—On April 16, Robert Harry Mornement, O.B.E., M.R.C.S., surgeon rear-admiral, R.N. retd., aged 74.
STRATHIE.—On April 18, David Murray Strathie, B.M. Oxfd, aged 28.

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Notes and News

TUBERCULOSIS IN SWEDEN

In his inaugural address at the University of Uppsala Prof. Erik Hedvall[1] claimed, with some justice, that "nowhere else in the world is there a better tuberculosis organisation than in our country." About 10,000 sanatorium beds, including about 1400 for children, are now provided at a cost in 1946 of about 27½ million kronor. At the end of that year there were 55 central dispensaries, 4 student dispensaries, and 471 district dispensaries devoted to tuberculosis and costing between 5 and 6 million kronor. Tuberculosis in cattle has been stamped out in the six most northerly counties, and elsewhere it is on the wane. Mass radiography in the county of Uppsala has revealed 1 new case of tuberculosis among every 350 persons examined.

"Together with general measures of hygiene," Hedvall said, "Calmette vaccination constitutes today our most important protective measure. Vaccination should therefore be carried out on all tuberculin-negative persons living in more or less continuous contact with the tuberculous." Every year the number of B.C.G. vaccinations is rising; the yearly total is now between 150,000 and 200,000. "There is no doubt whatever of its great value. What is being debated is only whether vaccination should be extended to the whole population of our country or only to certain groups." Hedvall himself favours the latter course, though he would have preferred the former but for the obstacles. Tuberculosis mortality having fallen from 191 per 100,000 in 1911 to 51 per 100,000 in 1946, and tuberculosis in children being strikingly on the wane as well as tuberculosis of the skin, glands, and bones, the disease will, in the opinion of many, have been conquered in 1960. The lecturer was disposed to endorse this forecast, with the reservation that though mortality will by then be remarkably low, morbidity will still be quite high and will still require many hospital beds.

PSYCHIATRIC SOCIAL WORK

Psychiatric social workers are still relatively rare and precious members of the mental-health services, but their small and highly trained group is growing. It is evidence of their keenness and curiosity that the Association of Psychiatric Social Workers has launched its own journal, the *British Journal of Psychiatric Social Work*.[2] At present the journal is to have the status of a yearbook, though Miss Margaret Ashdown, who writes the editorial introduction, hints that it may appear more often if social workers accept this chance to tell each other what their practice has taught them.

WHAT THE RED CROSS DID

In September, 1939, the staff of the International Committee of the Red Cross consisted of 50 workers; by April, 1945, there were almost 4000. By the end of October, 1946, the Geneva agency had 39 million names on their index, had forwarded 13 million letters and postcards for prisoners-of-war, and had transmitted and censored 24 million civilian letters. The hard work, intelligence, and sympathy which lie behind these figures emerge from the pages of the report[3] which the committee have now published. An example of the care needed to get details correct is that there were 15,000 people named Martin on the agency's files, and 1400 Jean Martins. Handling the food parcels was another complex job. On the Marseilles to Geneva line alone, the international committee moved goods equal in bulk to all Switzerland's food imports from overseas, and courage must have been needed to cross the Atlantic covered only by the Red Cross, while others were in strongly protected convoys. But in the end 36 million parcels were transported.

In its attempts to help civilians in occupied countries the Red Cross was hampered by lack of power. The Tokio draft convention had not been ratified, and the belligerents refused to undertake to implement it. The international committee did succeed in obtaining the concession that interned civilians should rank as prisoners-of-war, but only after a long struggle were they permitted to do anything for the deportees in the concentration camps. In 1943, when permission was given for the dispatch of parcels to individuals, only 100 names were on the files at Geneva. But parcels went, receipts came back with other names, the snowball grew, till by the end 750,000 parcels were sent. Other people whom the Red Cross could do all too little to help were the Russian prisoners—the U.S.S.R. had not ratified the 1929 convention—and the European prisoners in Japanese hands. A proposal to set up protected zones for wounded, sick, and children made in March, 1944, when air-raids were reaching their worst, was turned down by both sides.

By the end of the war the international committee had spent 45 million Swiss francs, of which more than half had been contributed by Switzerland.

1. *Quart. J. Swed. nat. Ass. Tuberc.* 1948, no. 1.
2. Obtainable from Miss Grant, 4, The Drive London, W.3. 3*s.* 6*d.*, postage 4*d.*
3. Inter Arma Caritas. Geneva, 1947.

"PEDIATRICS"

A new monthly, *Pediatrics*, appears with the sub-title "Journal of the American Academy of Pediatrics Inc." The *Journal of Pediatrics*, which has hitherto published the academy's official reports, remains in being, with Dr. B. Veeder still its editor; so pædiatricians must reconcile themselves to the necessity of studying yet one more journal if they are to keep in touch with developments across the Atlantic. The yearly subscription for *Pediatrics* is placed at $10, which makes the price in this country at 63*s.* seem rather high.

The January issue of the new periodical has a group of first-class articles, together with detailed reports of proceedings and activities of the Academy of Pediatrics. In a special-feature section, three main divisions deal with "the pediatrician and the public," "trends in health legislation and administration," and "public health, nursing, and medical social work." Here is a valuable development in social pædiatrics which, with the ultimate results of the elaborate child-health study now being undertaken, may well result in revolutionary changes in the whole field of medical work among children in the United States. Dr. Lee Forrest Hill's history of the academy indicates clearly the difficulties ahead, but there is a note of quiet confidence in the future which is certainly justified by the energy displayed in the new periodical. It has a strong editorial board and the editorship is in the safe hands of Dr. Hugh McCulloch. Blackwell Scientific Publications Ltd., 48, Broad Street, Oxford, are the agents in Great Britain.

THE DOCTOR AND THE QUEEN OF SIAM

In a mosquito house in the middle of her bedroom, a small elderly Siamese lady chose to spend all the last part of her life. The room measured some 25 by 15 feet, was carpeted, and contained, besides the house, two small tables bearing flowers—nothing else: no ornaments, no chairs. This was Queen Saowapa's chosen residence; she lived inside her mosquito house, which contained her bed and another small blackwood table. Sometimes in hot weather it also contained a woman with a long-handled fan; and when the Queen—she was the Queen Mother by then—was awake it also contained visitors, for her joy was conversation. The room was well provided with electric light, but was seldom well lit; often the only light in it was that above the Queen's bed. The windows had venetian shutters, and she slept by preference all day, waking towards evening to begin her circumscribed but engrossing social life. The moment she awoke they telephoned her doctor, who was expected to arrive at the palace as soon afterwards as possible.

The doctor was Dr. Malcolm Smith, who tells in a new book[1] much about this remarkable lady and her vast family of kingly and princely kinsmen, and related princesses by the hundred. She was shrewd and well informed, and his long visits were often spent in discussing world affairs with her. Under her father, King Mongkut, she had seen Siam brought under the influence of much that is good in European culture; and her husband King Chulalongkorn—who was also her half-brother by the same father—carried on the task of modernising his State in an enlightened way. Yet it has had its drawbacks: the taste for European dress has killed one of the finest crafts in Siam—that of weaving brocade. King Chulalongkorn's first act after his coronation was to abolish the custom by which those in an inferior position prostrated themselves before those of a higher social grade; however, it does not seem to have occurred to the Queen to take him seriously. "Everyone, no matter what their rank or relationship," Dr. Smith tells us, entered her room on their hands

1. A Physician at the Court of Siam. London: Country Life. 1947. Pp. 164. 15*s.*

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and knees. On leaving they departed as they had come, but moving backwards—even if hampered by top-boots and a sword. As a European, he was let off.

The book, full of vivid detail of Siamese customs, occasions, and arts, is a pleasant antidote to Europe in its austerity, and appeals to that sense of heraldry which Mr. John Betjeman rightly says is starved in England.

A SIMPLE VULCANISER

THE wide range of vulcanisers made by Messrs. William Frost Products Ltd., of Ferndale Road, London, W.9, includes a portable outfit (Model CT), costing 7*s.* 6*d.*, which is suitable for mending rubber (natural or synthetic) hot-water bottles, gloves, sheets, &c., as well as cycle and motor-cycle tyres. The necessary heat is obtained by putting a match to the 'Autotherm' fuel provided, and no skill is required to make a satisfactory repair. The makers suggest that in a hospital one of their autotherm or electric vulcanisers would save much rubber equipment from the scrap-heap.

University of London

Dr. Mary Barber has been appointed to the university readership in bacteriology at St. Thomas's Hospital medical school from Oct. 1.

Dr. Barber took the Conjoint qualification from the Royal Free in 1934, her M.B. Lond. two years later, and her M.D. in 1940. From 1936 to 1937 she was resident assistant in the pathology unit of the Royal Free, while holding an A. M. Bird scholarship. In 1938 she became assistant pathologist at the Archway group laboratory, and in 1940 assistant in the pathology department in the Post-graduate Medical School of London. Last year she was appointed lecturer in bacteriology at the school. Dr. Barber's published work includes papers on listerella and other organisms.

Mr. C. G. Rob has been appointed to the university readership in surgery at St. Thomas's Hospital medical school.

Mr. Rob qualified from St. Thomas's Hospital in 1937, taking his M.B. Camb. the following year, and his F.R.C.S. in 1939. In 1941 he obtained the M.CHIR. He has held surgical appointments at the Royal Victoria Hospital, Montreal, the Halifax Royal Infirmary, the Royal Surrey County Hospital, and St. Thomas's where he has been senior assistant to the surgical unit. During the war Mr. Rob was surgical specialist to the 1st Parachute Brigade and surgeon to a field surgical unit, with the rank of lieut-colonel. He was awarded the Military Cross in 1943 and was mentioned in despatches in 1945. He has published papers on abdominal wounds, and in 1946 he delivered a Hunterian lecture at the Royal College of Surgeons.

National University of Ireland

Dr. W. P. O'Callaghan has been appointed lecturer in bacteriology and public health at University College, Dublin, and Dr. M. J. Riordan, lecturer in medical jurisprudence, and Dr. B. F. Honan lecturer in mental diseases at University College, Cork.

Prof. J. M. O'Connor, has been reappointed representative on the General Medical Council, to hold office until April, 1951.

Royal College of Physicians

The Croonian lectures which were to be given by Dr. Desmond Curran in May have been postponed until Oct. 12 and 14.

Royal College of Obstetricians and Gynæcologists

On Friday, May 21, at 5 P.M., at the college, 58, Queen Anne Street, London, W.1, Prof. J. M. Munro Kerr will deliver the William Meredith Fletcher Shaw memorial lecture for 1948. He is to speak on Contracted Pelvis. Admission is by ticket to be obtained from the secretary of the college.

Society of Apothecaries

The Gillson scholarship in pathology has been awarded to Dr. Alan Thackray.

University College, London

On Tuesdays, April 27 and May 4 and 11, at 5 P.M. in the physiology theatre of the college, Gower Street, W.C.1, Mr. D. B. Fry, PH.D., will give three public lectures on speech.

National Association for the Prevention of Tuberculosis

The inaugural meeting of the medico-social section of the association will be held on Friday, May 7, at 5 P.M., at B.M.A. House, Tavistock Square, London, W.C.1. Sir Robert Young will preside, and Dr. N. Lloyd Rusby will speak on Social Aspects of Tuberculosis.

Royal College of Surgeons of England

At a meeting of the council held on April 15, with Sir Alfred Webb-Johnson, the president, in the chair, Mr. Harold Edwards and Mr. M. F. Nicholls were re-elected members of the court of examiners. Mr. John Taylor was appointed as an examiner in pathology for the diploma in anæsthetics.

Mr. S. A. S. Malkin, Mr. C. Gill-Carey, and Mr. T. P. McMurray were admitted as ad-eundem fellows. Dr. Ralston Paterson and Prof. Brian Windeyer were elected to the fellowship ad eundem, and the following as members of over 20 years' standing: Dr. C. A. Griffith, Dr. A. D. Marston, Dr. E. B. Alabaster, Mr. Ivor Lewis, Mr. H. V. Forster, and Mr. O. M. Duthie.

The Jacksonian prize for 1947 was awarded to Mr. Norman Tanner and a certificate of honourable mention to Mr. Rodney Smith. The subject set for the prize for 1949 was Malignant Disease of the Urinary Bladder.

Mr. Geoffrey Keynes was appointed Thomas Vicary lecturer and Sir Reginald Watson-Jones Robert Jones lecturer for 1948. Dr. A. F. Jackson and Dr. M. W. Carr were appointed Charles Tomes lecturers.

A diploma of fellowship was granted to James Cyril Angell, and the following diplomas were granted jointly with the Royal College of Physicians:

D.C.H.—J. R. G. Agius, Margaret C. Barron, R. G. G. Barry, Joan R. K. Bastable, Somnath Basu, J. S. Battersby, J. B. Berry, G. L. Brinkman, H. J. Brooks, Joyce B. Burke, R. U. Carr, Harish Chandra, Kathleen M. Chipperfield, Betty L. Coles, W. M. Connell, Olive Cooke, Christine E. Cooper, R. D. G. Creery, Dorothy S. Critchley, N. A. A. Cust, M. J. Cutler, J. G. A. Davel, E. G. Donovan, D. M. Douglas, Honor Doyle, Jean Edmonds, Gisela Eisner-Kissmann, Dorothy I. Elkin, P. J. M. England, Kathleen E. Faulkner, C. M. B. Field, Mary I. Fleming, Margaret Fouché, C. B. Franklin, J. Z. Garson, L. E. Gellman, Isaac Gordon, C. N. Grainger, C. L. Grandage, A. L. Griffiths, E. P. Griffiths, F. L. Groarke, W. S. Hacon, Marjorie K. Hall, L. P. Harington, Gwendoline Hewitt, J. G. Hoult, Irene E. Howorth, Myrtle M. Hutchins, W. P. U. Jackson, N. T. Jaco, John James, J. G. Jamieson, V. H. Jones, J. P. Kelly, Katharin I. Kerr, A. C. Kirby, Daisy F. Lee, Erwin Lister, D. C. Little, R. M. Littledale, Joan B. T. Logan, L. P. L. Loorham, Sarah Lorimer, Catherine H. Mackie, T. P. Mann, A. R. C. Margetts, J. K. Martin, Seymour Mason, Kathleen Mathers, B. M. O. Megat Khas, F. S. Mellows, J. C. G. Mercer, Edith M. Metcalfe, J. G. Millichap, Madeleine B. Morris, Sheila B. Moss-Morris, George Mundel, Margaret H. Mutch, Nora Naish, Petrie M. Newton, J. A. O'Connor, W. E. Parkes, P. R. P. Pearsall, N. K. Pein, Joan M. Pooley, Lois E. N. Price, Edward Pringle, Mary Pringle, L. J. Prosser, J. F. P. Quinton, Jerome Rabkin, P. M. Ransford, Enid A. Reed, Dilys M. Rees, Iorwerth Rees-Mathews, Reuben Resnekov, Rosemary J. Reynolds, Nest G. Richards, D. S. Rosenberg, Cyril Royle, R. H. Scott, H. P. Scurlock, C. G. R. Sell, A. D. Shirley, Hyman Shrand, Esther E. Simpson, Gerald Solomons, Ferdinand Stern, Elizabeth M. Stokes, P. R. Swyer, B. E. R. Symonds, W. F. Townsend-Coles, N. S. D. Venkatswamy, Elizabeth C. Whyte, C. G. Williams, Joan Williams, W. H. D. Wince, Josephine H. Wood, Grace E. Woods, Jean L. Wybar.

D.O.M.S.—Ivor Aubrey, J. T. Baird, G. B. Barlow, Nilmadhab Basu, Margaret A. Billinghurst, B. N. Consul, J. S. Conway, D. C. Coull, C. E. A. Cragg, G. D. Cumming, Clement D'Silva, E. W. Dorrell, A. T. G. Evans, Jan Fischer, J. B. Foster, Jacob Frankenthal, J. I. R. Gray, L. J. Green, G. S. Griffith, J. S. Groves, Elizabeth Hainsworth, Mahmoud Hashimi, Lillian Hodgson, M. E. Hollis, Griffith James, T. E. Jones, A. H. Katz, M. I. H. Kaufmann, J. N. Kerr, W. A. D. Lawson, G. H. Levien, R. F. Lowe, A. V. Madangopal, E. T. Meyer, Ephraim Miller, J. D. Milne, M. C. Mishra, N. D. Misurya, R. M. Moxham, S. I. Munib, D. R. Nanjappa, R. K. Pilcher, S. A. Railton, W. B. Ridsdel, H. Riley, L. A. Rook, A. M. Roy, Isidore Sacks, Selig Sacks, Louis Schrire, C. W. A. Searle, D. V. Sethi, J. V. Sheldon, J. W. Shield, M. S. Shroff, Cecilia M. Simmons, Ramanuj Sinha, A. T. O. Speirs, B. P. Srivastava, J. B. T. Thomas, S. W. Thomson, J. N. Tolia, J. L. Van Selm, H. E. Walker, F. B. Zwink.

D.T.M. & H.—P. A. Allsopp, J. E. G. Baker, Carlos Castillo, Asok Das Gupta, William Davidson, Nubar Derounian, Robert Dickie, A. J. Duggan, J. T. Erb, A. D. J. Farquharson, Patrick Feeny, S. L. Gauntlett, Shanti Ghosh, Mohamed Ghousuddin, Syed Ghousuddin, J. G. Guest, G. T. M. Hayes, Gladys I. Jeffree, D. E. Jeremiah, R. M. Jhala, W. H. Jopling, A. M. Khair, T. P. Loke, F. P. Morris, Basil Nicholson, P. E. Parker, F. R. Roberts, R. W. N. L. Ross, Steven Sas, K. R. Shroff, Herbert Spencer, Mildred A. R. Stilson, Mieczyslaw Srokowski, N. B. Thadani, I. T. The, B. M. Urs, J. M. Wilson.

Tuberculosis Association

This Association will meet in Birmingham on Friday and Saturday, May 21 and 22. Prof. W. Melville Arnott, Dr. A. G. Whitfield, and Dr. G. H. Armitage will speak on Cardio-respiratory Function, Dr. Francis Jarman on Bronchial Lesions, Dr. A. Clark Penman on Primary Tuberculosis in the Adult, and Dr. J. E. Geddes and Mr. A. L. d'Abreu on Selection of Cases for Thoracoplasty. Mr. Geoffrey Bateman will also show a colour film of Bronchial Tumours which was made by Dr. Paul Holinger, of St. Luke's Hospital, Chicago. The annual conference of the association will be held at Belfast from June 30 to July 3.

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London College of Osteopathy

A nine-month postgraduate course for registered medical practitioners will begin in October. Particulars may be had from the secretary of the college, 25, Dorset Square, N.W.1.

Faculty of Homœopathy

On Thursday, May 6, at 5 P.M., at the London Homœopathic Hospital, Great Ormond Street, W.C.1, Dr. William Briggs will speak on the Evolution of Clinical Pathology.

Tropical Medicine Meeting

A B.U.P. report says that some 2000 delegates from 37 nations are expected to attend the Fourth International Congress on Tropical Medicine and Malaria in Washington from May 10 to 18.

Design for a Pathological Department

The Association of Clinical Pathologists is offering three prizes for essays including a description and plans for a department of pathology. Further particulars will be found in our advertisement columns.

Coördination of International Congresses

Representatives of medical-science organisations have attended in Paris a meeting, called by the Interim Commission of WHO and by UNESCO, to discuss this subject. A permanent bureau is to be set up, with a view to furthering coördination.

Books for Europe

In support of the work of the Oxford Committee for Famine Relief, the vice-chancellor has issued an appeal, addressed particularly to members of the university, for books, including works of fiction, to be forwarded to European countries. Parcels should be addressed to "Book Appeal for Europe," 17, Broad Street, Oxford.

Royal Society

On Thursday, June 10, at 4.30 P.M., Dr. V. B. Wigglesworth will deliver a Croonian lecture on Insects as a Medium for the Study of Physiology. On Thursday, June 17, at 2.30 P.M. Sir Paul Fildes, F.R.S., will open a discussion on Analogues of Growth Factors in relation to Antibiotics. Both meetings will be held at Burlington House, Piccadilly, London, W.1.

Dentists Register

This year the register shows a welcome relaxation of austerity by returning to its pre-war practice of publishing a local list of dentists. During last year 314 names were added and the total number on the register at the end of 1947 was 15,160. The register is published for the Dental Board by Messrs. Constable and costs 18*s*.

South African Medical Journal

Dr. H. A. Shapiro has been appointed to the full-time post of editor of the journal in succession to Dr. J. S. du Plessis, who has been acting as part-time editor since 1945.

Dr. Shapiro has been government pathologist and senior lecturer in medical jurisprudence at the University of Cape Town for the past nine years. He is also honorary editor of the *Clinical Proceedings* of the Cape Town Post-Graduate Medical Association.

The Railway Executive

Dr. H. H. Cavendish Fuller has been appointed chief medical consultant to this body.

Dr. Cavendish Fuller graduated M.B. at the University of Edinburgh in 1912 and took his M.D. in 1931. After holding the post of resident medical officer at Princess Club Hospital, Bermondsey, he became medical officer to Malvern College and consulting surgeon to Great Malvern Hospital. He is at present chief medical officer to the Western Region at Paddington Station, and he will continue to hold this post in addition to his new appointment.

Conference on Medical Electronics

The British Association of Physical Medicine announces that its Belgian counterpart, the Société Belge de Physiothérapie has arranged for an international meeting on medical electronics to be held in conjunction with the Journées Médicales in Brussels from June 13 to 16. The subjects chosen include: general physics in its application to medicine; photobiological and electrobiological principles of direct importance to medicine; medical electrology with special reference to diagnosis and treatment; equipment and dosimetry. Those who wish to attend should write to Dr. L. Konings, rue Vilain XIV 43, Brussels, Belgium.

Physiology of Respiration

Prof. Hamilton Hartridge, F.R.S., will lecture on this subject at Gresham College, Basinghall Street, London, E.C.2, at 5.30 P.M. daily from Monday, April 26, to Thursday, April 29.

Joint Tuberculosis Council

The main subject of the February meeting was the action of various regional hospital boards in deputing the oversight of regional tuberculosis work to doctors charged with other duties. An instance was mentioned of the appointment of a medical officer in one region to supervise infectious-disease hospitals as well as the tuberculosis service, also an advertisement for one whose work would be "mainly concerned" with tuberculosis. Last year the council recommended the appointment in every region of a regional chest physician, who should possess not only administrative experience of a high order but also clinical ability at specialist level.

The council continue to be interested in the dietary requirements of tuberculous persons, especially those in sanatoria. The point at issue is the inadequacy of the present ration allowances for sanatorium patients compared to those of other population groups, nearly all of whom have access to food sources—e.g., canteens and school meals—not open to such patients.

Return to Practice

The Central Medical War Committee announces that Dr. Clifford G. Parsons, F.R.C.P., has resumed civilian practice at 89, Harborne Road, Edgbaston, Birmingham.

Lieut.-Colonel J. R. C. Greenlees has been appointed surgeon to the King's Body Guard for Scotland, Royal Company of Archers, in place of the late Dr. R. A. Fleming.

The April-May issue of the *A.B.C. World Airways and Shipping Guide* has a new format. The guide, which appears each month and costs 3*s*., provides comprehensive information about the world's air routes. The publishers are Thomas Skinner & Co. Ltd., 330, Gresham House, London, E.C.2.

Diary of the Week

APRIL 25 TO MAY 1

Monday, 26th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
6.15 P.M. Sir Gordon Gordon-Taylor: Glands in the Neck.

ROYAL SOCIETY OF ARTS, John Adam Street, W.C.2
4.30 P.M. Dr. Frankis Evans: Recent Advances in Anæsthesia. (Last of three Cantor lectures.)

Tuesday, 27th

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Mr. Rainsford Mowlem: Injuries of the Nose and Sinuses.

INSTITUTE OF LARYNGOLOGY & OTOLOGY, 330, Gray's Inn Road, W.C.1
4.30 P.M. Mr. Terence Cawthorne: Surgical Treatment of Deafness.

Thursday, 29th

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Mr. F. W. Watkyn-Thomas: Tinnitus.

HONYMAN GILLESPIE LECTURE
4.30 P.M. (Edinburgh Royal Infirmary.) Prof. J. R. Learmonth: Arterial Embolism.

Friday, 30th

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Mr. R. G. Macbeth: Osteomyelitis Secondary to Sinusitis.

Appointments

ASHER, R. A. J., M.D. Lond., M.R.C.P.: physician, Central Middlesex County Hospital.

BOCKNER, S. H., M.R.C.S.: first asst. M.O., York clinic for psychological medicine, Guy's Hospital, London.

GARTSIDE, V. O. B., M.A. Camb., M.R.C.S., D.P.H., D.I.H.: deputy M.O.H., Oxfordshire.

LAIDLAW, JEAN, M.B. Edin.: asst. psychiatrist, Crichton Royal Mental Hospital, Dumfries.

ROTTER, K. G., M.B. Lond., F.R.C.S., D.L.O.: surgeon, throat, nose, and ear department, West London Hospital.

SILBERSTEIN, FRIEDRICH, M.D. Vienna: pathologist, National Temperance Hospital, London.

STOKES, K. R., M.R.C.S.: medical director, Harefield County Hospital, Middlesex.

WILSON, J. F., B.SC., M.D. Edin.: director, pathological department, Royal Infirmary, Sunderland.

WYMAN, J. B., M.B.E., M.R.C.S., D.A.: anæsthetist, Westminster Hospital.

Hospital for Sick Children, Great Ormond Street, W.C.1:
BLACK, J. A., M.B. Camb., M.R.C.P.: house-physician.
FRITH, ELSPETH, M.B. Lond.: resident asst. M.O.
NASH, F. W., M.B. Lond., M.R.C.P.: house-physician.
ROE, WILLIAM, M.B.: house-surgeon.

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